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Turbulence Observations in the Upper Ocean During the Surface Wave Processes Program in the Northeast Pacific, February to March, 1990.

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TURBULENCE OBSERVATIONS IN THE UPPER OCEAN DURING THE SURFACE WAVE PROCESSES PROGRAM IN THE NORTHEAST PACIFIC, FEBRUARY TO MARCH 1990

by

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ABSTRACT

Crawford, W.R. 1992. Turbulence observations in the upper ocean during the Surface Wave Processes Program in the Northeast Pacific, February to March 1990. Can. Data Rep. Hydrogr. Ocean Sci. 106:165 pp.

This report presents the following water properties measured with the FLY II turbulence profiler: turbulent dissipation rate, Brundt-Vaisala frequency, temperature and salinity. These are displayed in graphical form.

Key Words: SWAPP, ocean turbulence, Northeast Pacific.

RESUME

Crawford, W.R. 1992. Turbulence observations in the upper ocean during the Surface Wave Processes Program in the Northeast Pacific, February to March 1990. Can. Data Rep. Hydrogr. Ocean Sci. 106:165 pp.

Ce rapport présente les propriétés de l'eau suivantes, mesurées par la sonde de profil de turbulence "FLY II": la dissipation turbulente, la frequence Brunt-Vaisala, la température et la salinité. Ces propriétés sont montrées graphiquement.

Mots-clés: SWAPP, turbulence, Pacifique du Nord-Est

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1. INTRODUCTION

These measurements were undertaken from the Canadian Survey Ship *Parizeau* during a cruise out of San Francisco from 24 February to 21 March 1990, as part of the Surface Wave Processes Program (SWAPP). This report presents the turbulence and water property measurements from the Fast Light Yo-Yo II (FLY II) profiler.

All measurements were taken in the proximity of FLIP, a Floating Instrument Platform, instrumented for this program with a variety of sensors. FLIP was anchored at 35° 8.2' N, 126° 59.0' W. *Parizeau* was near FLIP for the period 26 February to 18 March 1990.

2. TURBULENCE MEASUREMENTS

The graphs beginning on page 24 of this report display data from the turbulence profiler FLY II. Four water properties are plotted on each pair of pages: turbulent dissipation rate ε, Brundt-Vaisala frequency N, temperature and salinity. They are presented as profiles of each property, with as many as 10 profiles on each page. If the FLY II profiler penetrated past 105 m depth, a second set of plots presents the full profile over the entire depth of the profile. The series number is listed at the top of each page and the profile number is listed at the bottom of each profile. The nature of data processing and analysis for each property are described later in this section.

A detailed description of FLY II as used in coastal waters is presented by Dewey *et al.* (1987), and its use during the Ocean Storms Experiment in the Northeast Pacific is presented by Crawford and Gargett (1988). The configuration of FLY II used in the Ocean Storms Experiment in 1987 was maintained for this cruise, with the following changes: the gains and offsets of the temperature and conductivity circuits were changed, a new pressure sensor was installed, and the 30 cm diameter floats and brushes attached to FLY II at the top to reduce its fall speed were not used, but were replaced with tapered, 20-cm-diameter floats. With this change in floats and removal of brushes, vibrational noise signals in the shear channels were greatly reduced, and processing of turbulence signals was much easier.

We attempted to measure turbulence in the top 20 m of the ocean, with measurements beginning as close to the surface as possible. However, FLY II, like other profilers of its type equipped with airfoil shear probes to measure ocean turbulence, requires a free-fall descent. Therefore if attached to a ship, it must pull a slack line behind. Only two methods of deployment have been used in the past: profile off the stern through the ship wake while the ship moves slowly ahead, or profile off the windward side of a ship drifting broadside to the wind. In both cases the top few metres of the water are in the wake of the ship and the natural oceanic turbulence is overpowered by the ship-generated turbulence. Typically, the top ten metres is disturbed in the stern wake.

For this cruise we attempted to sample through undisturbed water, and to mark the surface with paper computer cards or lights to determine where in the Langmuir cells our profiles began. When profiling from *Parizeau* we frequently threw paper computer cards into the water in a line normal to the wind direction, and then, once these cards had lined up in the convergence zones of Langmuir cells, we profiled from the bow of *Parizeau*, into water undisturbed by the ship if possible. This maneuver required the ship to turn upwind just before a profile began, and stop just before the profiler was released. It is a time-consuming manoeuver, and we found the number of successful profiles completed was too

few for meaningful results. To increase the number of profiles, we often drifted broadside to the wind, with FLY II entering the water through the wake generated by the ship being blown downwind. In the latter half of the cruise we moved the winch and line puller to the stern, and profiled through the stern wake as the ship moved ahead at about one knot. As noted before, the top 10 or so metres of data were contaminated, but we have much more data at deeper depths.

Another method tried with more success was to operate from a 5-m launch, away from the *Parizeau*. We used the *Slicker*, owned by the Institute of Ocean Sciences and previously used as an oil spill cleanup vessel at the Institute. The launch is of a landing-barge design. Its flat bottom drew 10 cm of water, and once the outboard motors were raised its effect on upper layer turbulence was minimal. We tied a sea anchor (consisting of two drogues from Loran-C drifters) to a long line attached to the bow, and drifted slowly downwind, throwing computer cards into the water every few minutes. These were carried downwind, and converged into rows by the time *Slicker* drifted through. By fixing the line to the starboard or port side of the launch we could drift across the Langmuir cells, sampling in convergence zones marked by the computer cards, or in divergence zones between the cards.

Although we had a battery-powered winch, the in-water weight of FLY II is so low (about 2 Newtons) that it could be pulled in by hand. Power to the data-logging computer was provided by a battery and Rediline dc to ac voltage converter.

The *Slicker* could be launched and retrieved only in winds less than 9 m s^{-1}, but measurements were interesting at wind speeds over 5 m s^{-1}, leaving a small window of wind speeds for useful operations. Normally, when the wind speed exceeded 5 m s^{-1}, it sped up past 10 m s^{-1} too quickly for us to ready our equipment and put the launch in the water. However, we do have several days' of observations from the launch.

DATA PROCESSING

The signals are transmitted to the ship as 12-bit numbers, in groups of three. Each group of three has two shears, plus one of the slow channels: temperature, conductivity, tilt1, tilt2, water pressure, a battery voltage, and temperature gradient (on two channels). Each time a set of three numbers is transmitted, the next slow channel is selected, such that every eight samples of three, the pattern is repeated. Each shear channel is sampled at 274.3 s^{-1}, and each slow channel is sampled at 34.3 s^{-1}.

(a) shear

The dissipation rate (ε) in cm^2s^{-3} is computed from the formula

$$\varepsilon = 3.75\ \nu[(\partial u/\partial z)^2 + (\partial v/\partial z)^2]$$

where $\partial u/\partial z = SE/\rho GW^2$

and E denotes the output voltage of the electronics, S is the sensitivity of the shear probe in $cm^{-2}s^{-2}volt^{-1}$, ρ and ν the density and kinematic viscosity of seawater respectively, G the gain of the electronics, and W the fall speed in cm s^{-1}. The formula of Miyake and Koizumi (1948) is used to compute the viscosity. A standard value of 1.025 gm cm^{-3} is used for density.

Only two airfoil shear probes were used on this cruise. Both were manufactured by Undersea Marketing in 1983. Serial numbers are 141 (shear1) and 142 (shear2). These probes were aligned to sense the same component of velocity; i.e. the sensing beams were parallel. In past programs I observed that the rates of dissipation determined from each probe were close in magnitude, because these two components of turbulence $\partial u/\partial z$ and $\partial v/\partial z$ are close to isotropic at rates of dissipation in the upper mixed layer. Therefore, we gain no additional information by sensing orthogonal velocity components. However, I have had problems in determining that the probes are operating properly. Often, a probe will hit a particle in the water and generate a spurious signal. I use the second probe to help distinguish good from bad data, so the more identical the good signals, the easier it is to remove bad data. Therefore, the probes are aligned to produce nearly identical signals. Nevertheless, they are separated by a few centimetres, and the signals do differ at high frequencies.

The shear probes have been calibrated many times in the I.O.S. water tunnel over the past years, with the following gains S in units of 10^4 $cm^2s^{-2}volt^{-1}$:

probe	Apr 83	Oct 84	Sept 87	Oct 89
141	2.36	1.60	1.75	1.65
142	2.44	2.00	1.98	1.96

The calibration in April 1983 was done with a secondary reference probe and a non-standard calibration procedure, so this calibration value is given less weight. For processing, values of 1.75×10^4 and 1.96×10^4 were used for 141 and 142 respectively.

The spatial response function determined by Ninnis (1984) is used to compensate for lack of small scale resolution of this probe. These corrections are applied to the power spectrum of the signal, for the first 300 coefficients. At a sampling rate of 274 per second, a fall rate of 80 cm s^{-1}, and a spectral window of 1024 points, the 300th coefficient has a wavelength of 1 cm.

The gain G of the electronics falls off at high frequency, being a single pole filter with half-power point near 70 Hz. This attenuation is also compensated for in the power spectrum.

The first five points (the mean plus the next four Fourier coefficients) in the power spectrum were set to zero, since signals at these frequencies are sometimes contaminated by wobbles in the motion of FLY II as it falls through the water or by non-turbulent shears at density interfaces in regions where the turbulent signal is weak or absent. Although these non-turbulent shears do contribute to the dissipation, they are not isotropic turbulence and the multiplier of 7.5 which we apply to these individual signals is too big for this type of shear, as noted by Denman and Gargett (1988). This signal is found only in quiet regions, where little or no mixing is present. In deep-ocean turbulence such signals might be of interest, but near the surface where more energetic processes dominate mixing, this level of turbulence is ineffective.

The peak of the power spectrum of turbulent shears moves to shorter wavelengths as the dissipation increases. A region of the dissipation spectrum which is dominated by vibrational noise at low dissipations will have a real shear signal at high dissipations. Therefore, the upper limit to which the power-spectrum coefficients are summed varies with the variance of the spectrum. Four transition wavelengths were selected, as follows:

Fourier Coef. #	dissipation ε (cm^2s^{-3})
50	$9.0x10^{-6}$ to $4.5x10^{-5}$
100	$4.5x10^{-5}$ to $9.0x10^{-5}$
150	$9.0x10^{-5}$ to $9.0x10^{-3}$
300	$9.0x10^{-3}$ and greater

Generally less than 10% of dissipation is expected to be lost by truncating the spectra in this way, assuming that the dissipation spectra follow a universal spectrum. Note that this procedure is not "curve fitting" to determine the dissipation rate, but instead we sum the dissipation spectrum, and use a universal spectrum to determine the limits of integration. Errors introduced by the procedure are higher at low dissipation rates, since the signal to noise ratio is smaller in weak signals.

I found shear signals from this cruise to be more free of noise than the data from the Ocean Storms cruise (Crawford and Lueck, 1988) because I used smaller diameter floats on FLY II during SWAPP. Generally, as the diameter of the FLY II profiler decreases, the vibrational noise decreases. However, the instrument requires less weight at smaller diameter to fall at the same rate, and changes in fall speed during descent are greater. Since we usually profiled to shallower depths during SWAPP, this change in fall speed was not a serious problem, although it may have degraded the calculation of Brundt-Vaisala frequency due to a mismatch of temperature and conductivity response times.

(b) depth and fall speed.

Pressure is recorded on a slow channel at a rate of 274.3/8 = 32.3 data points per second. A new pressure sensor, Sensometrics SP91C, 0 to 500 psi, was installed in FLY II for this cruise. It increments every few centimetres of descent and greatly improves our accuracy in computing fall speed. The running mean filter used in previous analyses of the pressure signal of the Ocean Storms Experiment was no longer required. Fall speed was computed every block of 1024 shear data points, or about every 3.5 m.

The dissipation rate ε depends on the fourth power of the fall speed, derived from the pressure sensor. Our calibrations revealed a small kink in the pressure-voltage conversion near 10 psi, which would produce a 5% error in fall speed near this pressure (at a depth of about 7 m). We suspect an error in calibration may have caused this kink, but it remains unproven. Therefore, largest expected errors in dissipation due to errors in fall speed are about 20% near 7 m depth.

(c) Temperature

A Thermometrics P20 thermistor senses temperature. It is mounted at the nose of FLY, beside the two shear probes. Signals are amplified and recorded on a slow channel at 34.3 samples s^{-1} and passed through a differentiating preamplifier and recorded on two slow channels (#1 and 5) for a combined sampling rate of 68.6 samples s^{-1}. Temperature gradient signals were used as an indicator of mixing, to verify that the shear probes were sensing turbulence and not vibrations. At a rate of 68.6 samples s^{-1} the temperature gradient is sampled too slowly to resolve the full spectrum, and quantitative analysis of the vertical gradient of temperature is not possible.

A block average of temperature is computed from 1024/8 = 128 points and these block averages form the temperature profiles in the figures in this report. The gain and offset of the temperature circuit were set and calibrated prior to the cruise, assuming that our deepest profiles would be about 150 m. Some profiles later in the cruise went deeper, and temperatures went off scale. For such profiles, neither temperature nor salinity are plotted beyond the depth where temperature went below 9.3°C.

Early in the cruise the gain of the temperature circuit was changed to give better resolution of temperature. This circuit and thermistor 705a were calibrated in April following the cruise, and the quadratic calibration coefficients determined then were used. For the early profiles, calibration coefficients determined prior to the cruise were used. Comparison with temperature and salinity measured by the underway sampling loop in *Parizeau* shows typical differences of 0.1 degrees Celsius for profiles TC90 series 6 and SY90 series 20 and beyond. Temperatures for earlier SY90 profiles differ by 0.2 degrees Celsius from CTD-measured temperatures.

(d) Salinity

I compute salinity from conductivity and temperature. Conductivity is measured with a Sea-Bird SBE-4-04/A cell, mounted beside the pressure case near the nose, with the SBE-4-03 electronics inside the pressure case. We do not use a pump to force water through the cell, in order to conserve battery power and to avoid vibrating the shear probes. Therefore, response of the conductivity cell is slower than response of the thermistor. To eliminate spikes in salinity resulting from these differing response times, the temperature signal is lagged behind the conductivity signal when they are combined to calculate salinity.

Early in the cruise the gain of the temperature circuit was changed to give better resolution of temperature. This circuit and thermistor 705a, and the conductivity circuit were calibrated in April following the cruise, and the quadratic calibration coefficients determined then were used. For the early profiles, calibration coefficients determined prior to the cruise were used. Comparison with salinity measured by the underway sampling loop in *Parizeau* shows typical differences of 0.15 for profiles TC90 series 6 and SY90 series 20 and beyond, and 0.25 for earlier profiles.

Brunt-Vaisala frequency

From calculated values of temperature and salinity we compute Brundt-Vaisala frequency and plot it below the dissipations. Each value is computed from a centered difference of density over ± 1 block from the centre block. Therefore the vertical resolution is nominally 9 m, given a standard block length of 3 m. In some of the profiles the Brundt-Vaisala frequency drops below zero for ten or more metres, due to mismatch of response times of the temperature and conductivity probes, not to real instabilities in the water.

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Table 1

Listing of profile positions relative to Langmuir cells. I have listed only those profiles where the spacing between cells is noted and the profile position relative to these cells is noted. Cells were marked by computer cards or lights. Those profiles those profiles launched into ship wake are not noted here.

Series	Profile	Spaciing (m)	Dist from cards (m)
TC90 2	3	0	20 m
TC90 3	2	30	0
TC90 3	3	50	0
TC90 3	6	70	35 (approx)
TC90 6	3	30	0
TC90 6	4	30	15 (approx)
TC90 6	5	100	50 (approx)
TC90 6	6	100	40
TC90 6	7	100	0
TC90 6	11	100	5 (approx)
TC90 6	12	100	20 (approx)
TC90 6	13	20	10
TC90 6	15	40	10
TC90 6	17	15	0
TC90 6	18	13	3
TC90 7	2	5	0
TC90 7	3	20	8
TC90 8	2	20	3
TC90 8	3	10	5
TC90 8	4	15	7 (approx)
SY90 20	1	18	8
SY90 20	2	18	3
SY90 20	3	18	2
SY90 20	4	12	2
SY90 20	5	17	1
SY90 21	1	8	3
SY90 21	2	15	1
SY90 21	3	15	1
SY90 21	4	12	6
SY90 21	5	20	9
SY90 21	6	18	10
SY90 21	7	15	7
SY90 21	8	9	3
SY90 21	9	12	1
SY90 21	10	30	2
SY90 21	11	30	2
SY90 21	12	50	0
SY90 21	14	12	6
SY90 21	15	12	6
SY90 21	16	18	6
SY90 21	17	15	7
SY90 21	18	15	6
ST90 24	1	18	5

ST90 24	2	18	3
ST90 24	3	18	3
ST90 24	4	18	2
ST90 24	5	18	2
ST90 24	6	18	0
ST90 24	7	18	9
ST90 24	10	18	6
ST90 24	12	18	0
ST90 24	13	18	5
ST90 24	15	18	6
ST90 24	16	18	0
ST90 25	2	18	8
ST90 25	4	18	6

TABLE 2

Each line in this table, beginning on the following page, presents environmental and navigation information recorded at the beginning of each FLY II profile. Specifics of the data are listed below.

COLUMN 1:	denotes the profile number in a given series of profiles.
LORAN LAT/LONG	denotes position as determined by the ship Loran-C receiver.
DATE:	is listed as ddmmyy.
TIME:	in 24 hour clock, in Universal Coordinated Time (UTC).
TWIND S/D	denotes the true wind speed corrected for ship motion. Speed is in m s^{-1}, direction in degrees true.
SFC T	surface temperature in degrees Celsius as determined by the underway sampling device monitoring the ship intake water.
SFC S	surface salinity as determined by the underway sampling device monitoring the ship intake water.
SFC P	Atmospheric pressure in millibars as measured on ship.

Listed first are the series denoted TC90, using the data logging system on *Parizeau*; then the series denoted SY90, using the data logging system normally in the launch *Slicker*.

SAIL LIST FOR TC90

FLY: 2 SERIES: TC01

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 16.44N	126 56.96W	01-03-1990	13:26:59	7.7	164.3	13.70	33.14	1021.5
02	35 16.49N	126 56.85W	01-03-1990	13:35:20	8.0	165.5	13.71	33.17	1021.5

FLY: 2 SERIES: TC02

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
02	35 10.43N	126 59.59W	05-03-1990	18:31:31	7.5	19.4	12.60	32.85	1030.6
03	35 10.46N	126 59.65W	05-03-1990	18:33:39	8.3	20.6	12.61	32.87	1030.6

FLY: 2 SERIES: TC03

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 08.23N	127 00.78W	05-03-1990	21:06:39	6.8	5.6	12.73	32.89	1030.4
02	35 08.18N	127 00.88W	05-03-1990	21:17:05	6.0	2.0	12.71	32.87	1030.2
03	35 08.15N	127 00.99W	05-03-1990	21:23:26	5.0	11.2	12.72	32.88	1030.4
04	35 08.24N	127 01.19W	05-03-1990	21:31:41	7.6	13.4	12.74	32.89	1030.2
05	35 08.25N	127 01.22W	05-03-1990	22:01:03	6.8	358.2	12.74	32.88	1030.0
06	35 08.29N	127 01.26W	05-03-1990	22:05:17	7.5	359.7	12.74	32.89	1029.9
09	35 08.46N	127 01.08W	05-03-1990	22:30:14	6.9	7.3	12.75	32.88	1030.1
10	35 08.46N	127 01.08W	05-03-1990	22:32:14	6.9	7.3	12.75	32.88	1030.1
11	35 06.73N	126 55.99W	06-03-1990	18:53:53	3.6	38.0	12.90	32.92	1030.5
12	35 06.69N	126 55.94W	06-03-1990	18:58:08	3.6	20.2	12.91	32.92	1030.5
13	35 06.67N	126 55.89W	06-03-1990	19:02:19	3.3	18.9	12.91	32.92	1030.5
14	35 06.61N	126 55.87W	06-03-1990	19:08:37	3.3	10.9	12.92	32.92	1030.5

FLY: 2 SERIES: TC04

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 06.53N	126 55.84W	06-03-1990	19:18:00	4.4	17.9	12.98	32.93	1030.5
02	35 06.53N	126 55.84W	06-03-1990	19:20:00	4.4	17.9	12.98	32.93	1030.5

FLY: 2 SERIES: TC05

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 06.45N	126 55.80W	06-03-1990	19:27:18	3.3	22.5	12.95	32.92	1030.4
02	35 08.20N	127 00.65W	06-03-1990	21:22:46	3.2	357.9	13.05	32.94	1029.6
03	35 08.15N	127 00.73W	06-03-1990	21:29:00	3.1	326.7	13.11	32.94	1029.5
04	35 08.14N	127 00.73W	06-03-1990	21:31:05	2.1	333.7	13.12	32.92	1029.5
05	35 08.15N	127 00.68W	06-03-1990	21:33:12	2.9	332.3	13.15	32.94	1029.5
06	35 08.11N	127 00.75W	06-03-1990	21:35:18	3.0	321.4	13.14	32.94	1029.5
07	35 08.13N	127 00.65W	06-03-1990	21:41:37	2.8	315.4	13.03	32.92	1029.4
08	35 08.11N	127 00.70W	06-03-1990	21:43:44	2.0	312.1	13.14	32.92	1029.3
09	35 08.14N	127 00.64W	06-03-1990	21:45:50	3.3	342.2	13.14	32.98	1029.3

SAIL LIST FOR TC90

FLY: 2 SERIES: TC05

LORAN	LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
10	35 08.08N	127 00.69W	06-03-1990	21:54:15	2.3	339.7	13.16	32.93	1029.2
11	35 08.09N	127 00.63W	06-03-1990	21:56:21	2.7	326.3	13.14	32.93	1029.3
12	35 08.09N	127 00.63W	06-03-1990	22:00:33	1.6	338.9	13.18	32.93	1029.1
13	35 08.09N	127 00.61W	06-03-1990	22:08:57	2.4	326.1	13.22	32.95	1029.0
14	35 08.08N	127 00.65W	06-03-1990	22:11:02	2.7	336.7	13.19	32.94	1028.9
15	35 08.04N	127 00.70W	06-03-1990	22:15:16	3.1	310.5	13.20	32.93	1028.9
16	35 08.06N	127 00.61W	06-03-1990	22:19:23	2.4	321.5	14.23	32.93	1028.9
17	35 08.03N	127 00.68W	06-03-1990	22:25:42	2.2	335.7	13.20	32.93	1028.8
18	35 08.11N	127 00.49W	06-03-1990	22:27:50	2.9	324.7	13.17	32.93	1028.9
19	35 08.06N	127 00.60W	06-03-1990	22:29:57	2.6	335.7	13.13	32.91	1028.8
20	35 08.07N	127 00.58W	06-03-1990	22:34:08	4.3	338.1	13.05	32.95	1028.8
21	35 08.08N	127 00.59W	06-03-1990	22:44:36	2.3	335.4	13.23	32.93	1028.6
22	35 08.12N	127 00.49W	06-03-1990	22:48:48	3.0	331.8	13.17	32.95	1028.6
23	35 08.10N	127 00.52W	06-03-1990	22:53:01	2.0	323.8	13.31	32.92	1028.6
24	35 08.10N	127 00.52W	06-03-1990	22:55:01	2.0	323.8	13.31	32.92	1028.6
25	35 08.09N	127 00.54W	06-03-1990	22:59:18	3.5	341.1	13.30	32.96	1028.5

FLY: 2 SERIES: TC06

LORAN	LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 07.73N	127 00.95W	07-03-1990	22:18:01	13.5	340.9	12.88	32.89	1023.1
02	35 07.44N	127 00.79W	07-03-1990	22:51:33	12.9	338.8	12.87	32.89	1023.4
03	35 07.36N	127 00.85W	07-03-1990	22:59:58	13.6	345.1	12.85	32.89	1023.2
04	35 07.40N	127 00.76W	07-03-1990	23:08:19	13.9	336.6	12.85	32.89	1023.6
05	35 07.33N	127 00.83W	07-03-1990	23:20:52	14.5	334.2	12.84	32.88	1024.0
06	35 07.22N	127 00.80W	07-03-1990	23:27:08	14.7	346.4	12.84	32.88	1023.1
07	35 07.08N	127 00.52W	07-03-1990	23:45:58	13.3	350.1	12.83	32.88	1024.1
08	35 07.02N	127 00.54W	07-03-1990	23:54:21	11.2	355.7	12.83	32.88	1024.0
09	35 06.90N	127 00.52W	07-03-1990	23:58:34	13.3	9.5	12.83	32.87	1024.0
10	35 06.79N	127 00.46W	08-03-1990	00:02:44	13.2	345.4	12.83	32.89	1023.9
11	35 08.51N	127 02.66W	08-03-1990	21:32:38	10.5	24.0	12.73	32.89	1026.3
12	35 08.44N	127 02.73W	08-03-1990	21:38:58	10.7	4.1	12.74	32.90	1026.2
14	35 08.34N	127 02.82W	08-03-1990	21:55:47	14.8	346.1	12.72	32.89	1026.1
15	35 08.31N	127 02.88W	08-03-1990	22:02:04	13.7	346.9	12.73	32.88	1025.5
17	35 08.35N	127 02.91W	08-03-1990	22:14:38	9.6	342.5	12.74	32.89	1025.7
19	35 08.40N	127 03.05W	08-03-1990	22:29:23	10.4	355.3	12.73	32.89	1025.7
20	35 08.33N	127 03.11W	08-03-1990	22:33:30	8.3	2.2	12.74	32.89	1025.9
21	35 08.33N	127 03.05W	08-03-1990	22:35:36	8.2	351.7	12.74	32.89	1025.8
22	35 08.26N	127 03.09W	08-03-1990	22:39:47	7.2	351.9	12.75	32.90	1025.9
23	35 08.26N	127 03.10W	08-03-1990	22:41:53	6.9	340.9	12.75	32.89	1025.8
24	35 08.24N	127 03.05W	08-03-1990	22:46:04	8.8	334.0	12.74	32.89	1025.6
25	35 08.17N	127 03.12W	08-03-1990	22:50:16	10.3	343.8	12.74	32.89	1025.6
26	35 08.09N	127 03.15W	08-03-1990	22:56:35	8.2	6.6	12.73	32.89	1025.7
27	35 08.00N	127 03.27W	08-03-1990	23:00:47	8.9	4.5	12.73	32.88	1025.8
28	35 08.00N	127 03.19W	08-03-1990	23:07:04	9.1	7.1	12.74	32.89	1025.6
29	35 07.97N	127 03.22W	08-03-1990	23:11:16	10.4	352.0	12.74	32.89	1025.6

SAIL LIST FOR TC90

FLY: 2 SERIES: TC07

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 09.25N	127 04.10W	09-03-1990	04:57:26	9.9	358.1	12.69	32.89	1024.9
02	35 09.08N	127 04.16W	09-03-1990	05:12:04	9.3	352.6	12.70	32.89	1025.2
03	35 09.05N	127 04.16W	09-03-1990	05:20:27	9.4	352.3	12.69	32.89	1024.8
04	35 08.75N	127 03.99W	09-03-1990	05:51:52	7.4	15.2	12.70	32.89	1025.3
05	35 08.76N	127 03.78W	09-03-1990	05:56:05	10.0	340.2	12.70	32.89	1025.3
06	35 08.67N	127 03.81W	09-03-1990	06:00:15	7.1	.3	12.69	32.89	1025.3
07	35 08.55N	127 03.77W	09-03-1990	06:06:35	6.6	354.1	12.69	32.89	1025.5
08	35 08.49N	127 03.79W	09-03-1990	06:10:50	6.8	346.7	12.68	32.89	1025.4
09	35 08.45N	127 03.74W	09-03-1990	06:15:00	5.4	348.8	12.69	32.89	1025.5
10	35 08.40N	127 03.79W	09-03-1990	06:17:06	6.6	358.7	12.68	32.89	1025.6
12	35 08.31N	127 03.78W	09-03-1990	06:21:18	6.6	351.9	12.68	32.88	1025.6
14	35 08.26N	127 03.64W	09-03-1990	06:27:36	5.5	339.1	12.67	32.88	1025.5
15	35 08.20N	127 03.63W	09-03-1990	06:31:47	5.0	341.3	12.67	32.88	1025.3
16	35 08.04N	127 03.77W	09-03-1990	06:36:01	5.3	348.0	12.68	32.88	1025.5
17	35 08.07N	127 03.62W	09-03-1990	06:42:15	5.6	335.8	12.68	32.89	1025.5
18	35 08.01N	127 03.51W	09-03-1990	06:46:29	6.6	329.8	12.68	32.89	1025.2
19	35 07.95N	127 03.61W	09-03-1990	06:48:35	5.5	343.7	12.67	32.89	1025.2
20	35 07.85N	127 03.53W	09-03-1990	06:56:56	6.7	344.1	12.67	32.88	1025.3

FLY: 2 SERIES: TC08

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 07.32N	127 00.05W	10-03-1990	04:16:04	8.0	309.9	12.71	32.89	1020.7
02	35 07.45N	127 00.12W	10-03-1990	04:37:03	8.0	295.3	12.71	32.88	1021.2
03	35 07.30N	127 00.19W	10-03-1990	04:49:38	8.8	299.8	12.72	32.88	1021.0
05	35 07.33N	126 59.91W	10-03-1990	05:12:45	6.3	293.7	12.71	32.88	1021.5
06	35 07.22N	127 00.06W	10-03-1990	05:16:58	7.8	300.4	12.71	32.88	1021.7
07	35 07.22N	126 59.89W	10-03-1990	05:23:12	7.0	292.1	12.71	32.88	1021.5
08	35 07.20N	126 59.81W	10-03-1990	05:27:28	5.7	298.9	12.74	32.88	1021.4
09	35 07.09N	126 59.74W	10-03-1990	05:35:50	6.3	293.6	12.71	32.89	1021.5
10	35 07.10N	126 59.62W	10-03-1990	05:40:04	4.8	294.1	12.73	32.88	1021.5
11	35 07.11N	126 59.50W	10-03-1990	05:44:13	5.7	289.2	12.73	32.89	1021.5
12	35 07.12N	126 59.35W	10-03-1990	05:48:24	5.9	284.3	12.72	32.90	1021.6
13	35 07.02N	126 59.46W	10-03-1990	05:52:36	5.3	295.2	12.73	32.88	1021.8
14	35 07.06N	126 59.20W	10-03-1990	05:56:48	5.5	295.1	12.73	32.89	1021.5
15	35 07.23N	126 59.40W	10-03-1990	06:13:36	8.0	297.3	12.71	32.88	1021.7
16	35 07.14N	126 59.48W	10-03-1990	06:24:04	7.2	289.7	12.71	32.88	1021.8
17	35 07.12N	126 59.45W	10-03-1990	06:34:33	9.4	301.9	12.71	32.88	1021.9
18	35 07.09N	126 59.39W	10-03-1990	06:38:46	7.1	288.0	12.71	32.88	1021.9
19	35 07.13N	126 59.31W	10-03-1990	06:40:49	6.8	278.2	12.71	32.88	1021.8
20	35 07.10N	126 59.17W	10-03-1990	06:47:05	7.0	286.5	12.72	32.89	1021.9
21	35 07.03N	126 59.08W	10-03-1990	06:55:28	7.8	344.5	12.71	32.89	1021.8
22	35 07.03N	126 59.12W	10-03-1990	06:57:33	7.3	344.1	12.72	32.89	1021.8
23	35 07.02N	126 58.90W	10-03-1990	07:01:50	7.1	316.8	12.73	32.89	1021.9
24	35 06.97N	126 58.93W	10-03-1990	07:05:59	4.1	322.1	12.72	32.89	1021.8
25	35 06.97N	126 58.82W	10-03-1990	07:08:04	5.8	339.7	12.72	32.89	1021.8

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FLY: 2 SERIES: TC08

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
26	35 06.98N	126 58.63W	10-03-1990	07:14:26	4.1 296.6	12.73	32.89	1021.6
27	35 07.10N	126 58.80W	10-03-1990	07:27:03	8.3 277.5	12.71	32.90	1021.5
28	35 07.03N	126 58.98W	10-03-1990	07:31:10	7.4 291.7	12.71	32.89	1021.3
29	35 06.97N	126 58.95W	10-03-1990	07:35:22	5.9 292.7	12.72	32.89	1021.5
30	35 07.05N	126 58.78W	10-03-1990	07:39:34	6.7 308.7	12.72	32.89	1021.5
31	35 07.03N	126 58.71W	10-03-1990	07:45:51	6.7 274.4	12.72	32.89	1021.5
32	35 07.03N	126 58.65W	10-03-1990	07:50:07	7.5 280.2	12.72	32.90	1021.5
33	35 07.07N	126 58.43W	10-03-1990	07:54:17	6.7 275.7	12.72	32.89	1021.5
34	35 07.09N	126 58.42W	10-03-1990	07:58:29	5.8 282.8	12.73	32.89	1021.4
35	35 07.13N	126 58.28W	10-03-1990	08:00:35	5.1 283.9	12.73	32.90	1021.4
37	35 07.05N	126 58.37W	10-03-1990	08:08:56	8.5 307.3	12.73	32.89	1021.5
38	35 07.04N	126 58.22W	10-03-1990	08:13:08	6.0 282.0	12.73	32.90	1021.3
39	35 07.03N	126 58.26W	10-03-1990	08:17:19	7.8 283.9	12.73	32.90	1021.4
40	35 06.94N	126 58.41W	10-03-1990	08:46:35	9.4 289.5	12.71	32.90	1020.7
41	35 07.00N	126 58.45W	10-03-1990	08:52:55	7.3 285.0	12.73	32.90	1020.8
42	35 07.00N	126 58.25W	10-03-1990	08:59:09	5.5 281.4	12.72	32.89	1021.0

FLY: 2 SERIES: TC09

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
01	35 07.30N	126 59.46W	11-03-1990	00:18:25	12.5 312.1	13.80	33.13	1019.9
02	35 07.07N	126 59.40W	11-03-1990	00:33:01	11.9 319.3	13.78	33.13	1019.9
03	35 07.02N	126 59.29W	11-03-1990	00:45:35	12.3 321.4	13.78	33.12	1020.2
04	35 06.93N	126 59.13W	11-03-1990	00:51:55	9.4 313.1	13.76	33.12	1020.3

FLY: 2 SERIES: TC10

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
01	35 09.30N	126 54.05W	12-03-1990	04:35:56	10.0 328.6	13.02	32.97	1025.5
02	35 09.20N	126 53.94W	12-03-1990	04:42:09	11.7 332.6	12.99	32.96	1025.3
03	35 09.12N	126 54.02W	12-03-1990	04:46:21	12.2 334.2	12.96	32.95	1025.7
04	35 08.88N	126 54.12W	12-03-1990	04:56:47	12.7 331.2	13.01	32.96	1025.9
05	35 08.76N	126 54.18W	12-03-1990	05:00:58	11.1 325.1	13.00	32.97	1025.7
06	35 08.63N	126 54.31W	12-03-1990	05:07:14	10.2 327.3	13.07	32.98	1025.6
07	35 08.56N	126 54.32W	12-03-1990	05:11:26	10.1 345.3	13.11	32.98	1025.8
08	35 08.48N	126 54.40W	12-03-1990	05:15:36	10.2 340.3	13.14	33.00	1025.9
09	35 08.43N	126 54.36W	12-03-1990	05:19:48	10.5 333.9	13.15	33.01	1025.9
10	35 08.38N	126 54.27W	12-03-1990	05:24:01	9.3 329.6	13.20	33.01	1026.0
11	35 08.35N	126 54.20W	12-03-1990	05:28:14	9.1 342.6	13.28	33.03	1026.1
12	35 08.25N	126 54.25W	12-03-1990	05:34:31	10.1 338.3	13.33	33.05	1026.0
13	35 08.25N	126 54.25W	12-03-1990	05:36:31	10.1 338.3	13.33	33.05	1026.0
14	35 08.08N	126 54.40W	12-03-1990	05:40:47	8.3 334.1	13.31	33.04	1026.3
15	35 08.09N	126 54.16W	12-03-1990	05:44:59	9.6 342.5	13.32	33.04	1026.2
16	35 08.00N	126 54.07W	12-03-1990	05:51:13	11.2 329.6	13.22	33.02	1026.5
17	35 07.93N	126 54.07W	12-03-1990	05:55:27	7.2 348.2	13.21	33.02	1026.4

SAIL LIST FOR TC90

FLY: 2 SERIES: TC10

LORAN	LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
18	35 07.89N	126 53.89W	12-03-1990	06:01:43	7.2 354.9	13.24	33.03	1026.5
19	35 07.76N	126 53.98W	12-03-1990	06:05:57	8.6 357.2	13.24	33.00	1026.6
20	35 07.73N	126 53.99W	12-03-1990	06:08:03	8.2 349.1	13.24	33.02	1026.5
21	35 07.63N	126 54.08W	12-03-1990	06:12:11	7.4 338.4	13.24	33.03	1026.6
22	35 07.67N	126 53.93W	12-03-1990	06:16:22	7.3 333.6	13.20	33.02	1026.6
23	35 07.60N	126 53.89W	12-03-1990	06:18:29	8.8 335.2	13.19	33.01	1026.6
24	35 07.44N	126 54.02W	12-03-1990	06:24:43	11.1 325.4	13.23	33.02	1026.7
25	35 07.37N	126 53.99W	12-03-1990	06:28:58	7.7 337.5	13.24	33.03	1026.7
26	35 07.31N	126 54.08W	12-03-1990	06:31:00	9.8 335.4	13.24	33.04	1026.6
27	35 07.34N	126 53.84W	12-03-1990	06:35:09	8.8 336.8	13.17	33.01	1026.7
28	35 07.20N	126 53.97W	12-03-1990	06:39:21	9.2 329.7	13.22	33.02	1026.8
30	35 07.03N	126 53.96W	12-03-1990	06:49:51	11.1 331.1	13.27	33.03	1026.9
31	35 07.00N	126 53.93W	12-03-1990	06:51:57	9.9 337.2	13.27	33.03	1027.0
32	35 06.94N	126 53.82W	12-03-1990	06:58:11	8.8 330.8	13.25	33.03	1027.0

FLY: 2 SERIES: TC11

LORAN	LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
01	35 10.11N	126 58.39W	17-03-1990	02:35:29	8.3 173.3	13.74	33.05	1018.7
02	35 09.92N	126 58.41W	17-03-1990	02:43:57	10.0 179.3	13.73	33.04	1018.7
03	35 09.83N	126 58.31W	17-03-1990	02:48:07	8.7 187.0	13.73	33.04	1018.6
04	35 09.63N	126 58.34W	17-03-1990	02:56:35	8.7 177.4	13.72	33.04	1018.6
05	35 09.49N	126 58.41W	17-03-1990	03:00:42	8.2 178.1	13.71	33.04	1018.6
06	35 09.37N	126 58.44W	17-03-1990	03:07:00	8.3 185.1	13.70	33.03	1018.7
07	35 09.24N	126 58.51W	17-03-1990	03:11:10	9.0 184.4	13.70	33.03	1018.6
08	35 09.11N	126 58.52W	17-03-1990	03:15:22	9.6 180.5	13.69	33.03	1018.6
09	35 09.00N	126 58.46W	17-03-1990	03:21:43	6.8 192.6	13.68	33.02	1018.8
10	35 08.83N	126 58.63W	17-03-1990	03:25:51	8.8 173.1	13.68	33.02	1018.7
11	35 08.79N	126 58.43W	17-03-1990	03:30:05	9.0 178.2	13.67	33.02	1018.7
12	35 08.65N	126 58.45W	17-03-1990	03:36:24	9.4 174.7	13.67	33.02	1018.8
13	35 08.62N	126 58.45W	17-03-1990	03:38:29	9.2 184.8	13.67	33.03	1018.9
14	35 08.47N	126 58.46W	17-03-1990	03:44:50	9.4 183.3	13.67	33.02	1018.9
15	35 08.39N	126 58.53W	17-03-1990	03:46:54	9.7 181.6	13.67	33.01	1018.9
16	35 08.34N	126 58.48W	17-03-1990	03:51:04	9.5 185.4	13.67	33.01	1019.0
17	35 08.24N	126 58.57W	17-03-1990	03:55:18	9.2 190.0	13.66	33.01	1018.9
18	35 08.15N	126 58.57W	17-03-1990	03:57:25	8.7 187.3	13.66	33.01	1018.9
19	35 07.98N	126 58.61W	17-03-1990	04:05:44	9.3 181.8	13.65	33.01	1019.1
20	35 07.90N	126 58.58W	17-03-1990	04:09:59	8.4 189.0	13.65	33.01	1019.1
21	35 07.90N	126 58.58W	17-03-1990	04:11:59	8.4 189.0	13.65	33.01	1019.1
22	35 07.78N	126 58.60W	17-03-1990	04:16:15	11.0 184.9	13.64	33.00	1019.2
23	35 07.77N	126 58.37W	17-03-1990	04:20:31	9.8 187.8	13.64	33.01	1019.2
24	35 07.65N	126 58.54W	17-03-1990	04:24:41	10.2 190.9	13.64	32.99	1019.2
25	35 07.58N	126 58.52W	17-03-1990	04:28:53	9.5 189.5	13.63	33.00	1019.2
26	35 07.58N	126 58.36W	17-03-1990	04:31:00	9.8 182.9	13.63	32.99	1019.4
27	35 07.47N	126 58.47W	17-03-1990	04:35:12	8.8 193.3	13.63	33.00	1019.4
28	35 07.37N	126 58.47W	17-03-1990	04:41:30	8.4 186.6	13.62	33.00	1019.3

SAIL LIST FOR TC90

FLY: 2 SERIES: TC11

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
29	35 07.27N	126 58.50W	17-03-1990	04:45:44	10.3	188.3	13.62	32.99	1019.4
30	35 07.26N	126 58.48W	17-03-1990	04:47:48	10.4	188.1	13.61	32.99	1019.4

FLY: 2 SERIES: TC12

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 08.89N	126 58.20W	17-03-1990	05:23:26	9.9	197.2	13.70	33.03	1019.7
02	35 08.77N	126 58.32W	17-03-1990	05:27:37	10.4	181.1	13.69	33.03	1019.7
03	35 08.61N	126 58.37W	17-03-1990	05:33:53	11.0	182.8	13.69	33.03	1019.8
04	35 08.56N	126 58.34W	17-03-1990	05:38:04	9.2	188.8	13.69	33.03	1019.6
05	35 08.45N	126 58.34W	17-03-1990	05:42:18	10.5	191.3	13.69	33.03	1019.7
06	35 08.43N	126 58.32W	17-03-1990	05:44:24	9.9	185.5	13.69	33.03	1019.8
07	35 08.29N	126 58.38W	17-03-1990	05:50:40	10.2	192.6	13.69	33.03	1019.8
08	35 08.20N	126 58.35W	17-03-1990	05:54:56	10.6	186.7	13.69	33.03	1019.8
09	35 08.11N	126 58.31W	17-03-1990	05:59:05	8.6	187.8	13.68	33.02	1019.8
10	35 08.00N	126 58.53W	17-03-1990	06:01:12	9.3	194.0	13.68	33.02	1019.7
11	35 07.92N	126 58.51W	17-03-1990	06:07:30	10.5	188.3	13.67	33.02	1019.9
12	35 07.71N	126 58.37W	17-03-1990	06:20:05	8.2	192.7	13.65	33.02	1019.8
13	35 07.63N	126 58 53W	17-03-1990	06:22:09	9.3	195.4	13.64	33.01	1019.9
14	35 07.52N	126 58.47W	17-03-1990	06:28:25	9.3	194.2	13.62	33.01	1020.0
15	35 07.44N	126 58.45W	17-03-1990	06:32:39	9.7	194.8	13.62	33.01	1020.0
16	35 07.27N	126 58.64W	17-03-1990	06:36:46	8.8	194.9	13.63	33.01	1019.9
17	35 07.28N	126 58.51W	17-03-1990	06:40:58	9.3	195.0	13.63	33.01	1020.0

FLY: 2 SERIES: TC13

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 09.40N	126 58.60W	17-03-1990	07:18:48	8.3	198.7	13.78	33.05	1019.9
02	35 09.34N	126 58.53W	17-03-1990	07:22:57	9.2	200.4	13.78	33.05	1019.8
03	35 09.27N	126 58.50W	17-03-1990	07:27:09	8.7	190.6	13.77	33.05	1019.7
04	35 09.13N	126 58.62W	17-03-1990	07:31:24	8.8	203.8	13.77	33.04	1019.8
05	35 09.08N	126 58.62W	17-03-1990	07:35:32	7.8	198.4	13.76	33.04	1019.8
06	35 09.01N	126 58.60W	17-03-1990	07:39:45	9.9	193.2	13.76	33.04	1019.8
07	35 08.98N	126 58.45W	17-03-1990	07:43:57	10.7	202.9	13.75	33.04	1019.8
08	35 08.90N	126 58.48W	17-03-1990	07:48:10	8.5	193.0	13.76	33.04	1019.8
09	35 08.77N	126 58.62W	17-03-1990	07:52:23	9.1	187.9	13.75	33.03	1019.8
10	35 08.74N	126 58.58W	17-03-1990	07:56:35	9.8	195.7	13.74	33.03	1019.7
11	35 08.66N	126 58.56W	17-03-1990	08:00:47	8.2	198.4	13.73	33.04	1019.8
12	35 08.59N	126 58.53W	17-03-1990	08:05:01	8.6	207.3	13.72	33.03	1019.7
13	35 08.52N	126 58.59W	17-03-1990	08:07:07	8.0	204.9	13.72	33.03	1019.7
14	35 08.35N	126 58.65W	17-03-1990	08:13:21	8.0	205.7	13.71	33.03	1019.8
15	35 08.30N	126 58.68W	17-03-1990	08:17:33	7.2	205.6	13.71	33.03	1019.9
16	35 08.24N	126 58.64W	17-03-1990	08:19:37	8.1	193.6	13.71	33.03	1019.8
17	35 08.15N	126 58.66W	17-03-1990	08:25:52	7.9	200.2	13.70	33.02	1019.8
18	35 08.00N	126 58.90W	17-03-1990	08:30:04	7.2	209.3	13.70	33.02	1019.7

SAIL LIST FOR TC90

FLY: 2 SERIES: TC13

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
19	35 08.01N	126 58.68W	17-03-1990	08:36:21	7.6	204.2	13.69	33.01	1019.7
20	35 07.92N	126 58.83W	17-03-1990	08:40:35	7.6	213.7	13.69	33.01	1019.7
21	35 07.83N	126 58.83W	17-03-1990	08:44:44	8.3	213.0	13.69	33.02	1019.7
22	35 07.83N	126 58.78W	17-03-1990	08:48:56	7.4	210.6	13.68	33.02	1019.8
23	35 07.69N	126 58.84W	17-03-1990	08:55:12	7.1	205.8	13.68	33.02	1019.8
24	35 07.62N	126 58.88W	17-03-1990	08:59:24	6.7	208.9	13.68	33.02	1019.9
25	35 07.50N	126 58.95W	17-03-1990	09:05:44	6.3	213.1	13.68	33.01	1019.8
26	35 07.48N	126 58.91W	17-03-1990	09:07:48	6.6	216.7	13.68	33.02	1019.9
27	35 07.38N	126 58.92W	17-03-1990	09:14:05	6.0	215.6	13.67	33.01	1019.8
28	35 07.44N	126 58.65W	17-03-1990	09:16:13	6.0	211.9	13.66	33.01	1019.9
29	35 07.33N	126 58.79W	17-03-1990	09:20:24	6.1	210.8	13.66	33.01	1019.8
30	35 07.31N	126 58.69W	17-03-1990	09:26:37	6.3	218.0	13.65	33.01	1019.8
31	35 07.22N	126 58.80W	17-03-1990	09:30:52	5.6	217.9	13.65	33.01	1019.8
32	35 07.13N	126 58.93W	17-03-1990	09:32:55	6.3	222.2	13.65	33.01	1019.9

FLY: 2 SERIES: TC14

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 08.84N	126 58.66W	17-03-1990	20:41:34	1.3	278.7	14.50	33.07	1022.6
02	35 08.80N	126 58.84W	17-03-1990	20:47:53	.9	293.2	14.69	33.10	1022.6
03	35 08.80N	126 58.90W	17-03-1990	20:54:08	1.8	273.0	14.76	33.08	1022.6
04	35 08.75N	126 59.05W	17-03-1990	21:00:30	1.6	263.0	14.24	33.03	1022.5
05	35 08.73N	126 59.14W	17-03-1990	21:06:46	2.0	279.8	14.63	33.10	1022.5
06	35 08.64N	126 59.32W	17-03-1990	21:15:08	2.1	260.0	14.25	33.04	1022.4
07	35 08.62N	126 59.44W	17-03-1990	21:23:33	1.8	284.9	14.78	33.07	1022.5
08	35 08.60N	126 59.65W	17-03-1990	21:32:00	1.5	267.8	14.62	33.05	1022.4
09	35 08.61N	126 59.82W	17-03-1990	21:38:18	1.1	291.4	14.62	33.09	1022.3
10	35 08.60N	127 00.06W	17-03-1990	21:48:44	.5	344.8	14.75	33.08	1022.3
11	35 08.63N	127 00.14W	17-03-1990	21:57:06	.5	325.7	14.68	33.08	1022.1
12	35 08.64N	127 00.22W	17-03-1990	22:01:19	.6	327.1	14.72	33.05	1022.2
13	35 08.63N	127 00.40W	17-03-1990	22:11:52	.4	336.6	14.82	33.03	1022.2
14	35 08.64N	127 00.57W	17-03-1990	22:18:08	.9	290.5	14.74	33.01	1022.1
15	35 08.68N	127 00.68W	17-03-1990	22:26:32	2.0	297.6	14.63	32.97	1022.1
16	35 08.66N	127 00.93W	17-03-1990	22:34:56	.6	301.3	14.80	33.07	1022.0
17	35 08.68N	127 00.92W	17-03-1990	22:36:59	1.6	309.9	14.89	33.14	1022.1
18	35 08.71N	127 01.12W	17-03-1990	22:49:37	.5	98.3	14.74	33.03	1021.9
19	35 08.70N	127 01.38W	17-03-1990	22:57:58	.4	43.2	14.70	33.24	1021.8
20	35 08.75N	127 01.40W	17-03-1990	23:02:11	.4	53.4	14.82	33.06	1021.8
21	35 08.81N	127 01.53W	17-03-1990	23:08:29	.7	30.7	14.87	32.97	1021.8

FLY: 2 SERIES: TC15

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 07.74N	126 59.68W	18-03-1990	04:12:49	2.5	31.4	14.51	33.16	1022.4
02	35 07.68N	126 59.91W	18-03-1990	04:19:07	2.8	4.1	14.48	33.06	1022.6

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FLY: 2 SERIES: TC15

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
03	35 07.64N	127 00.13W	18-03-1990	04:27:30	2.4	10.8	14.39	33.06	1022.8
04	35 07.67N	127 00.33W	18-03-1990	04:35:55	2.4	347.2	14.33	33.06	1022.8
05	35 07.68N	127 00.37W	18-03-1990	04:42:09	1.6	12.5	14.44	33.07	1022.9
06	35 07.66N	127 00.67W	18-03-1990	04:50:31	2.1	15.6	14.43	33.07	1023.2
07	35 07.66N	127 01.17W	18-03-1990	05:05:13	3.0	354.3	14.44	33.08	1023.4
08	35 07.72N	127 01.42W	18-03-1990	05:30:19	2.5	4.9	14.47	33.12	1023.5
09	35 07.71N	127 01.74W	18-03-1990	05:36:37	1.5	9.7	14.48	33.05	1023.5
10	35 07.72N	127 01.96W	18-03-1990	05:45:02	2.0	55.1	14.46	33.07	1023.7
11	35 07.70N	127 02.28W	18-03-1990	05:53:25	2.0	9.6	14.28	33.06	1023.8

FLY: 2 SERIES: TC16

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D		SFC T	SFC S	SFC P
01	35 14.59N	127 02.12W	18-03-1990	12:09:06	1.4	126.6	14.26	33.05	1022.9
02	35 14.46N	127 01.93W	18-03-1990	12:17:26	2.0	224.5	14.32	33.06	1022.8
03	35 14.20N	127 01.97W	18-03-1990	12:25:50	3.0	126.7	14.39	33.06	1022.7
04	35 14.09N	127 01.82W	18-03-1990	12:34:13	1.4	230.4	14.36	33.05	1022.6
05	35 13.93N	127 01.83W	18-03-1990	12:42:37	3.2	136.3	14.28	33.05	1022.5
06	35 13.69N	127 01.70W	18-03-1990	12:53:08	2.8	128.7	14.12	33.05	1022.6
08	35 13.57N	127 01.63W	18-03-1990	13:01:32	1.9	104.9	14.05	33.05	1022.6
09	35 13.29N	127 01.57W	18-03-1990	13:12:01	2.7	96.8	14.07	33.04	1022.5
10	35 13.10N	127 01.43W	18-03-1990	13:22:29	2.1	126.6	14.11	33.05	1022.5
11	35 12.86N	127 01.57W	18-03-1990	13:30:50	.6	129.3	14.12	33.05	1022.6
12	35 12.75N	127 01.34W	18-03-1990	13:39:13	.9	126.0	14.07	33.04	1022.6
13	35 12.39N	127 01.34W	18-03-1990	13:51:46	1.8	97.6	14.05	33.05	1022.7
14	35 12.23N	127 01.24W	18-03-1990	14:00:11	2.3	115.6	14.12	33.05	1022.8
15	35 12.02N	127 01.26W	18-03-1990	14:08:37	3.2	133.3	14.14	33.05	1022.8
16	35 11.83N	127 01.11W	18-03-1990	14:17:01	2.5	89.4	14.14	33.05	1022.9
17	35 11.70N	127 01.06W	18-03-1990	14:23:22	.3	323.7	14.11	33.04	1023.1
18	35 11.58N	127 00.68W	18-03-1990	14:33:51	1.7	174.6	14.16	33.05	1023.1
19	35 11.51N	127 00.72W	18-03-1990	14:35:55	1.3	245.9	14.17	33.05	1023.2
20	35 11.49N	127 00.65W	18-03-1990	14:38:01	1.2	246.6	14.14	33.05	1023.2
21	35 11.44N	127 00.63W	18-03-1990	14:40:07	2.4	157.6	14.18	33.05	1023.3
22	35 11.38N	127 00.62W	18-03-1990	14:42:14	2.9	146.3	14.19	33.06	1023.4
23	35 11.32N	127 00.65W	18-03-1990	14:44:20	1.5	116.1	14.21	33.06	1023.3
24	35 11.30N	127 00.55W	18-03-1990	14:46:30	1.1	120.2	14.22	33.06	1023.3
25	35 11.22N	127 00.54W	18-03-1990	14:50:37	.7	43.0	14.19	33.04	1023.5
26	35 11.18N	127 00.55W	18-03-1990	14:52:43	.6	341.0	14.18	33.04	1023.4

SAIL LIST FOR SY90

FLY: 2 SERIES: SY06

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
01	35 07.03N	126 59.47W	03-03-1990	21:57:22	2.7 306.1	13.17	32.89	1022.9

FLY: 2 SERIES: SY07

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
02	35 08.03N	126 58.69W	04-03-1990	22:25:17	10.7 316.2	12.70	32.84	1023.1
03	35 08.00N	126 58.58W	04-03-1990	22:29:28	8.8 329.0	12.71	32.84	1023.1
04	35 07.91N	126 58.69W	04-03-1990	22:31:34	13.5 318.2	12.70	32.85	1023.2
05	35 07.87N	126 58.63W	04-03-1990	22:35:44	13.3 323.8	12.71	32.85	1023.4
06	35 07.81N	126 58.62W	04-03-1990	22:39:53	12.2 331.8	12.69	32.85	1023.3
07	35 07.73N	126 58.60W	04-03-1990	22:44:04	10.2 329.9	12.69	32.84	1023.4
09	35 07.85N	126 58.88W	04-03-1990	23:59:26	9.1 316.5	12.69	32.85	1023.7

FLY: 2 SERIES: SY08

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
01	35 08.15N	127 00.76W	06-03-1990	21:18:33	2.6 325.5	13.04	32.92	1029.8
03	35 08.20N	127 00.65W	06-03-1990	21:22:46	3.2 357.9	13.05	32.94	1029.6
04	35 08.20N	127 00.64W	06-03-1990	21:26:53	3.1 311.8	13.11	32.94	1029.5
05	35 08.15N	127 00.73W	06-03-1990	21:29:00	3.1 326.7	13.11	32.94	1029.5
07	35 08.15N	127 00.68W	06-03-1990	21:33:12	2.9 332.3	13.15	32.94	1029.5
08	35 08.11N	127 00.75W	06-03-1990	21:35:18	3.0 321.4	13.14	32.94	1029.5
09	35 08.13N	127 00.65W	06-03-1990	21:41:37	2.8 315.4	13.03	32.92	1029.4

FLY: 2 SERIES: SY09

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
04	35 08.08N	127 00.69W	06-03-1990	21:54:15	2.3 339.7	13.16	32.93	1029.2
05	35 08.09N	127 00.63W	06-03-1990	22:02:38	1.7 359.0	13.15	32.93	1029.1
06	35 08.09N	127 00.61W	06-03-1990	22:08:57	2.4 326.1	13.22	32.95	1029.0
07	35 08.08N	127 00.65W	06-03-1990	22:11:02	2.7 336.7	13.19	32.94	1028.9
08	35 08.04N	127 00.70W	06-03-1990	22:15:16	3.1 310.5	13.20	32.93	1028.9
09	35 08.06N	127 00.61W	06-03-1990	22:19:23	2.4 321.5	14.23	32.93	1028.9
10	35 08.03N	127 00.68W	06-03-1990	22:25:42	2.2 335.7	13.20	32.93	1028.8
11	35 08.06N	127 00.60W	06-03-1990	22:29:57	2.6 335.7	13.13	32.91	1028.8
12	35 08.06N	127 00.60W	06-03-1990	22:31:57	2.6 335.7	13.13	32.91	1028.8
13	35 08.10N	127 00.53W	06-03-1990	22:36:16	2.3 346.1	13.28	32.96	1028.8
14	35 08.08N	127 00.59W	06-03-1990	22:44:36	2.3 335.4	13.23	32.93	1028.6
15	35 08.12N	127 00.49W	06-03-1990	22:48:48	3.0 331.8	13.17	32.95	1028.6
16	35 08.10N	127 00.52W	06-03-1990	22:53:01	2.0 323.8	13.31	32.92	1028.6
17	35 08.10N	127 00.52W	06-03-1990	22:55:01	2.0 323.8	13.31	32.92	1028.6
18	35 08.09N	127 00.54W	06-03-1990	22:59:18	3.5 341.1	13.30	32.96	1028.5

FLY: 2 SERIES: SY20

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
01	35 09.32N	126 57.84W	12-03-1990	21:47:53	5.6 336.4	12.89	32.94	1028.7

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FLY: 2 SERIES: SY20

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
02	35 09.98N	126 57.59W	12-03-1990	22:02:35	5.3 351.6	12.95	32.95	1028.7
03	35 10.16N	126 57.53W	12-03-1990	22:06:47	6.3 344.9	13.01	32.96	1028.6
04	35 10.32N	126 57.55W	12-03-1990	22:11:03	6.8 345.6	13.06	32.98	1028.6
05	35 10.15N	126 57.70W	12-03-1990	22:23:39	6.6 6.6	12.90	32.92	1028.5

FLY: 2 SERIES: SY21

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
01	35 09.78N	126 57.69W	12-03-1990	22:29:55	8.0 336.1	12.88	32.93	1028.4
02	35 09.62N	126 57.61W	12-03-1990	22:34:08	5.5 353.2	12.86	32.92	1028.5
03	35 09.53N	126 57.55W	12-03-1990	22:42:28	6.6 351.8	12.86	32.91	1028.4
04	35 09.56N	126 57.52W	12-03-1990	22:48:47	7.5 339.6	12.86	32.92	1028.4
05	35 09.50N	126 57.49W	12-03-1990	22:55:06	9.4 338.7	12.87	32.92	1028.4
06	35 09.47N	126 57.49W	12-03-1990	22:59:16	7.4 338.1	12.85	32.92	1028.3
07	35 09.47N	126 57.49W	12-03-1990	23:01:16	7.4 338.1	12.85	32.92	1028.3
08	35 09.39N	126 57.51W	12-03-1990	23:07:36	7.6 356.6	12.83	32.91	1028.3
09	35 09.34N	126 57.59W	12-03-1990	23:11:49	7.4 348.1	12.82	32.91	1028.3
10	35 09.31N	126 57.57W	12-03-1990	23:18:08	5.3 354.1	12.81	32.91	1028.3
11	35 09.30N	126 57.48W	12-03-1990	23:22:24	7.3 348.0	12.82	32.91	1028.5
12	35 09.28N	126 57.50W	12-03-1990	23:24:28	7.4 .2	12.83	32.92	1028.5
14	35 09.29N	126 57.30W	12-03-1990	23:32:52	7.3 3.5	12.85	32.92	1028.3
15	35 09.27N	126 57.26W	12-03-1990	23:37:02	7.3 351.2	12.86	32.92	1028.3
16	35 09.27N	126 57.26W	12-03-1990	23:39:02	7.3 351.2	12.86	32.92	1028.3
17	35 09.04N	126 57.40W	12-03-1990	23:43:18	6.6 352.8	12.85	32.92	1028.6
18	35 08.81N	126 57.95W	12-03-1990	23:47:30	7.0 343.2	12.79	32.90	1028.6
19	35 08.22N	126 58.66W	12-03-1990	23:55:54	6.7 355.6	12.82	32.91	1028.4
20	35 07.98N	126 58.40W	12-03-1990	23:58:03	8.0 338.9	12.82	32.91	1028.3
22	35 08.38N	126 59.52W	14-03-1990	19:18:51	3.5 216.3	13.37	32.94	1029.2
23	35 08.38N	126 59.48W	14-03-1990	19:27:12	2.7 226.2	13.38	32.94	1028.9
24	35 08.33N	126 59.42W	14-03-1990	19:35:35	2.4 236.7	13.39	32.94	1028.9
25	35 08.41N	126 59.26W	14-03-1990	19:39:51	3.2 232.7	13.35	32.94	1028.9
26	35 08.48N	126 59.24W	14-03-1990	19:46:07	1.9 231.0	13.37	32.95	1028.9
27	35 08.39N	126 59.09W	14-03-1990	20:02:56	2.5 252.8	13.39	32.94	1028.8
28	35 08.50N	126 58.89W	14-03-1990	20:09:12	3.1 229.1	13.50	32.95	1028.7
29	35 08.17N	126 57.72W	14-03-1990	20:15:32	3.8 242.9	13.35	32.88	1029.0
30	35 07.68N	126 56.57W	14-03-1990	20:21:48	3.7 251.5	13.23	32.85	1028.8
31	35 07.95N	126 56.33W	14-03-1990	20:28:09	2.7 269.6	13.05	32.85	1028.8

FLY: 2 SERIES: SY22

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
01	35 07.93N	126 56.40W	14-03-1990	21:18:29	3.6 232.4	13.14	32.89	1027.8
02	35 07.96N	126 56.64W	14-03-1990	21:35:17	2.8 231.0	13.12	32.88	1027.8
03	35 07.88N	126 56.67W	14-03-1990	21:41:34	3.9 246.7	12.86	32.86	1027.9
04	35 07.85N	126 56.62W	14-03-1990	21:54:12	4.6 263.6	13.31	32.89	1028.2

SAIL LIST FOR SY90

FLY: 2 SERIES: SY22

	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
05	35 07.85N	126 56.58W	14-03-1990	21:58:25	4.7 257.1	13.36	32.87	1028.3
06	35 07.84N	126 56.53W	14-03-1990	22:02:37	5.6 277.6	13.30	32.90	1028.4
07	35 07.75N	126 56.89W	14-03-1990	22:08:55	6.9 270.5	13.44	32.90	1028.4
08	35 07.83N	126 57.90W	14-03-1990	22:15:12	8.1 272.6	13.56	32.93	1028.5
09	35 07.98N	126 58.53W	14-03-1990	22:19:23	7.8 279.4	13.51	32.91	1028.7
10	35 08.02N	126 58.79W	14-03-1990	22:25:38	7.3 277.2	13.59	32.93	1029.0
11	35 07.92N	126 58.88W	14-03-1990	22:29:52	6.2 273.6	13.34	32.99	1028.8

FLY: 2 SERIES: SY23

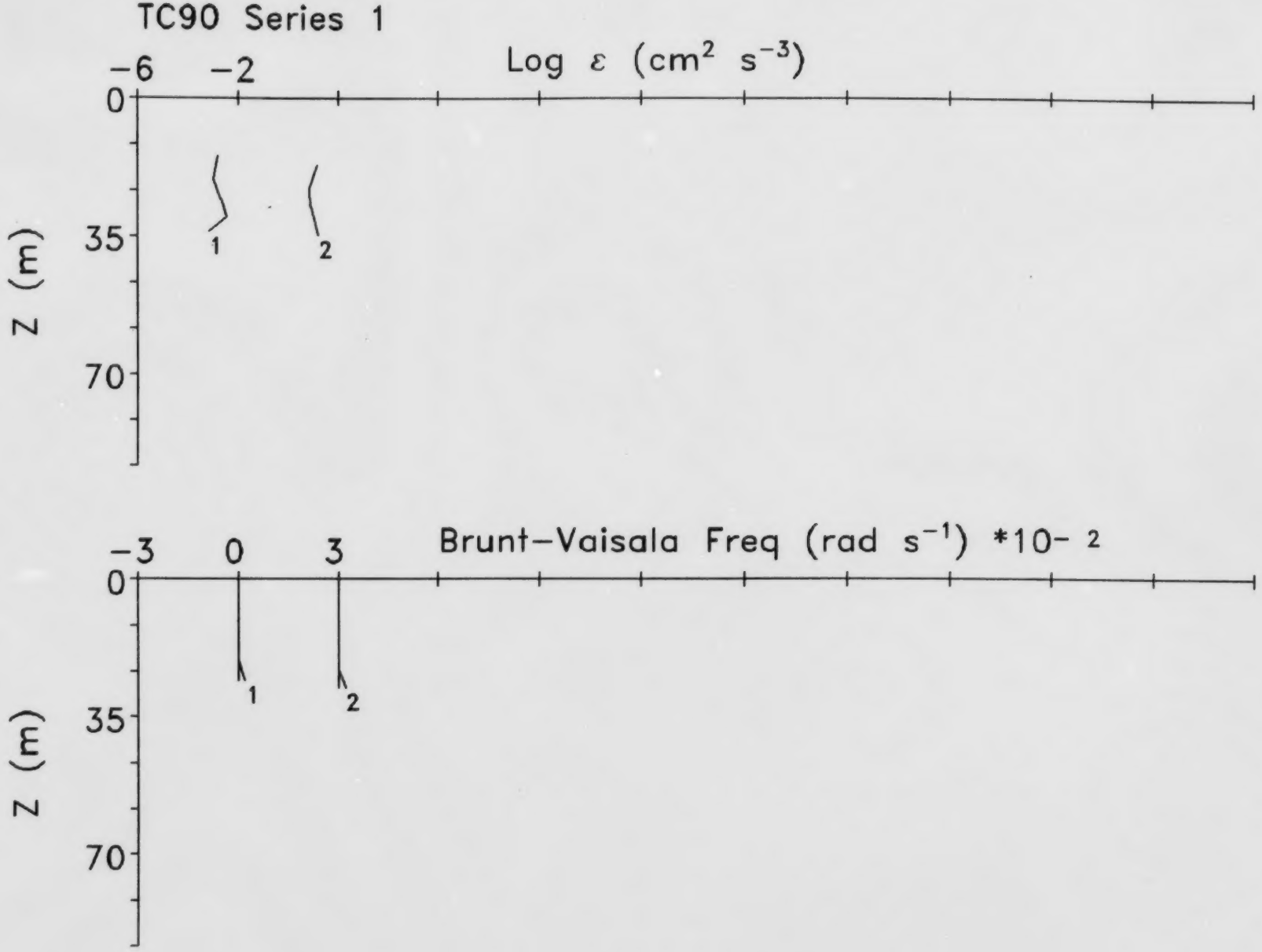
	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
01	35 07.99N	127 00.09W	15-03-1990	01:13:43	6.2 262.4	13.26	32.90	1027.5
02	35 08.03N	127 00.27W	15-03-1990	01:26:20	7.2 273.4	13.25	32.89	1027.4
05	35 08.20N	127 00.23W	15-03-1990	01:47:14	4.6 293.6	13.19	32.88	1027.4
06	35 08.22N	127 00.31W	15-03-1990	01:55:35	4.9 286.0	13.16	32.88	1027.4
07	35 08.34N	127 00.22W	15-03-1990	02:01:54	4.6 292.6	13.15	32.87	1027.4
08	35 08.31N	127 00.34W	15-03-1990	02:06:04	4.5 297.0	13.13	32.88	1027.4
09	35 08.37N	127 00.41W	15-03-1990	02:14:26	4.0 295.8	13.14	32.88	1027.3
10	35 08.38N	127 00.50W	15-03-1990	02:20:45	3.8 277.0	13.14	32.88	1027.4

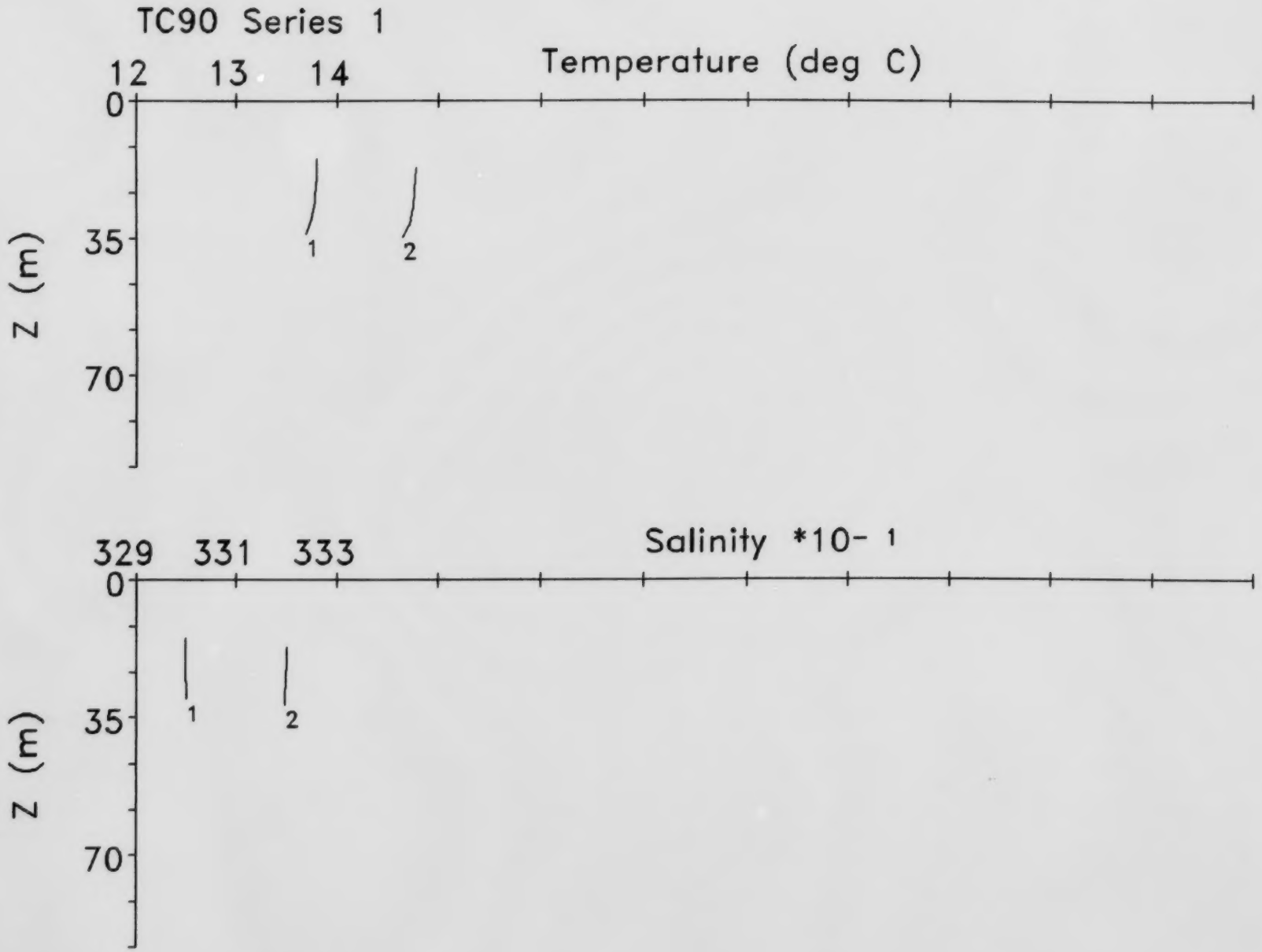
FLY: 2 SERIES: SY24

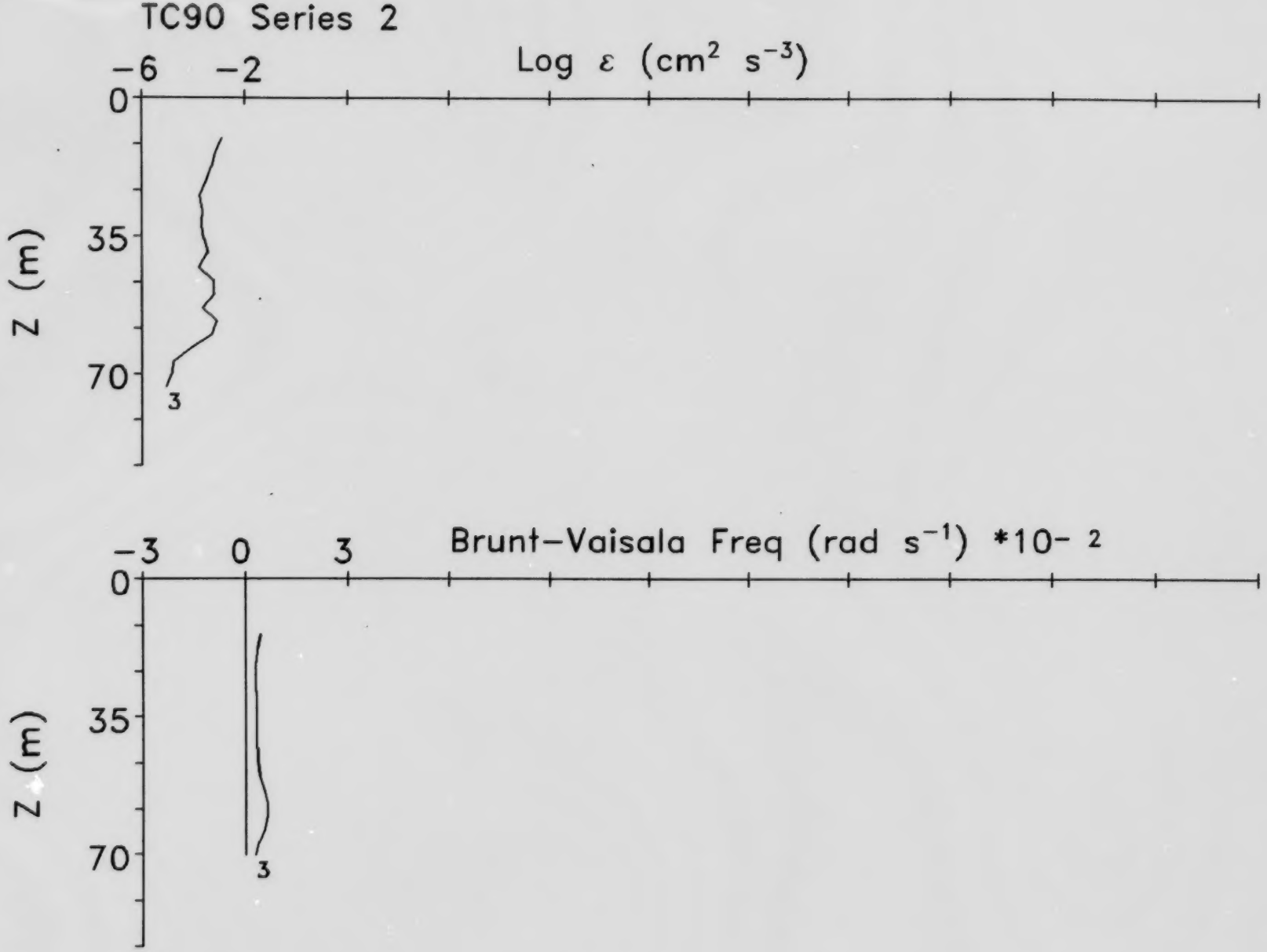
	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
01	35 06.18N	127 00.57W	16-03-1990	22:09:17	10.2 164.1	13.10	32.84	1018.9
02	35 06.22N	127 00.67W	16-03-1990	22:13:31	3.9 139.6	13.11	32.83	1018.7
03	35 06.22N	127 00.67W	16-03-1990	22:15:31	3.9 139.6	13.11	32.83	1018.7
04	35 06.25N	127 00.71W	16-03-1990	22:17:40	11.7 153.8	13.10	32.85	1018.6
05	35 06.34N	127 00.62W	16-03-1990	22:21:52	9.9 181.6	13.11	32.84	1018.8
06	35 06.35N	127 00.56W	16-03-1990	22:24:02	7.3 182.0	13.09	32.84	1018.7
07	35 06.53N	127 00.39W	16-03-1990	22:26:03	7.5 178.7	13.11	32.85	1018.8
10	35 07.12N	126 59.82W	16-03-1990	22:34:27	7.7 174.8	13.11	32.85	1018.9
12	35 07.30N	126 59.51W	16-03-1990	22:38:37	8.5 190.3	13.15	32.86	1018.9
13	35 07.54N	126 59.30W	16-03-1990	22:47:02	8.8 175.2	13.26	32.89	1018.7
15	35 07.57N	126 59.22W	16-03-1990	22:49:09	8.6 178.9	13.28	32.90	1018.7
16	35 07.58N	126 59.17W	16-03-1990	22:55:24	9.1 169.9	13.29	32.93	1018.6

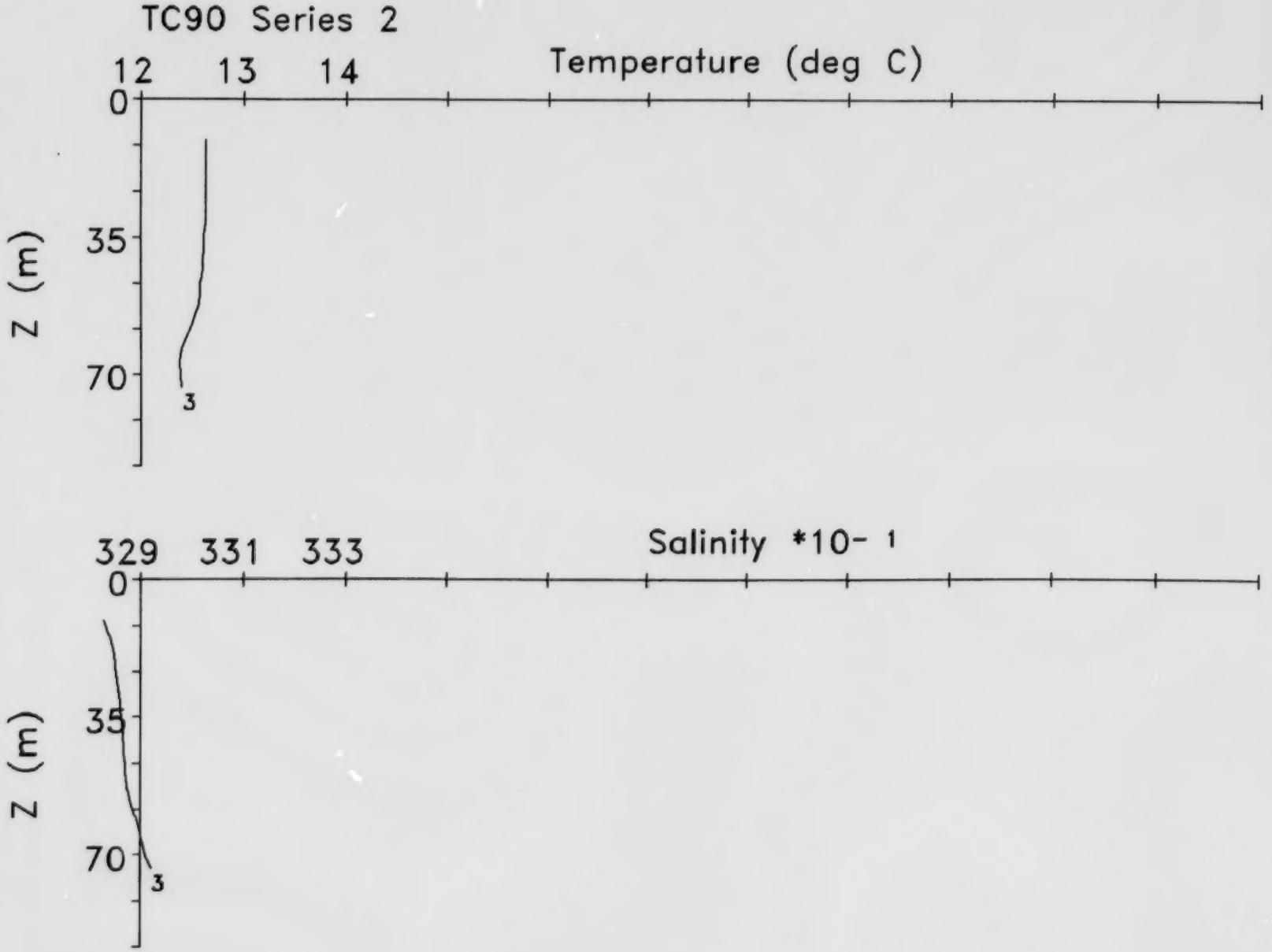
FLY: 2 SERIES: SY25

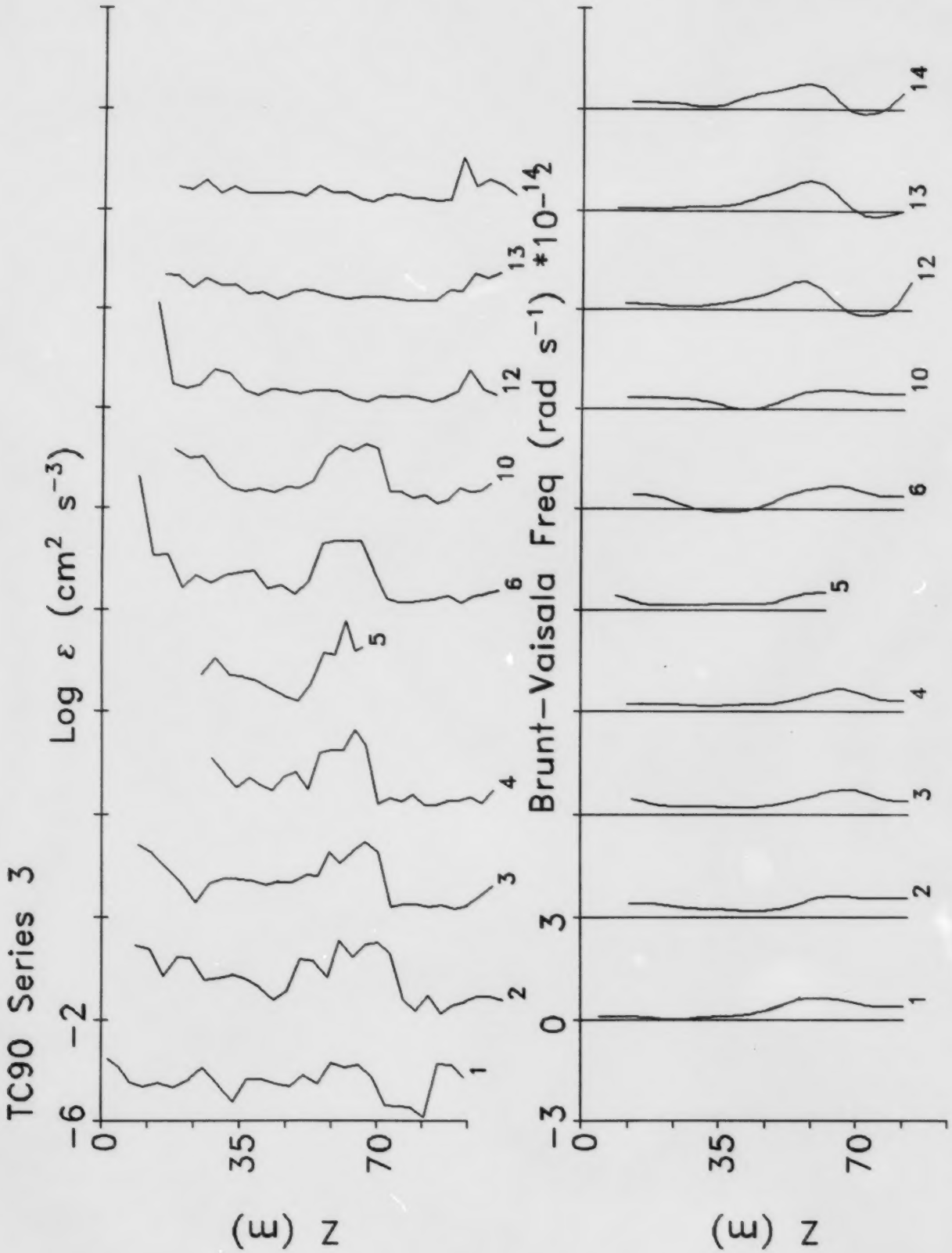
	LORAN LAT/LONG.		DATE	TIME	TWIND S/D	SFC T	SFC S	SFC P
02	35 08.26N	126 59.43W	16-03-1990	23:10:07	8.3 175.1	13.53	32.97	1018.6
04	35 08.50N	126 59.36W	16-03-1990	23:14:16	10.0 178.9	13.57	32.98	1018.6

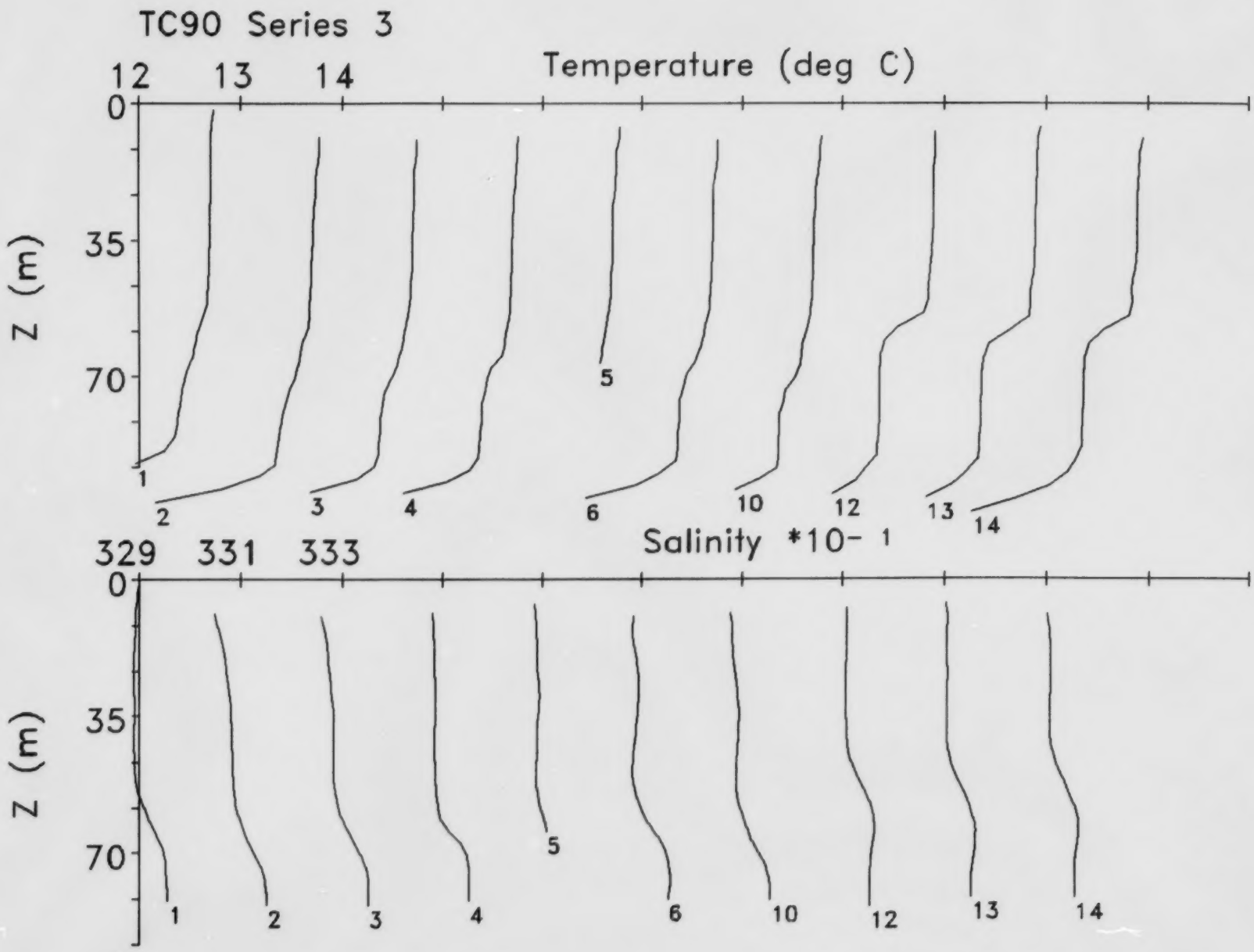

TC90 Series 1
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
1
2

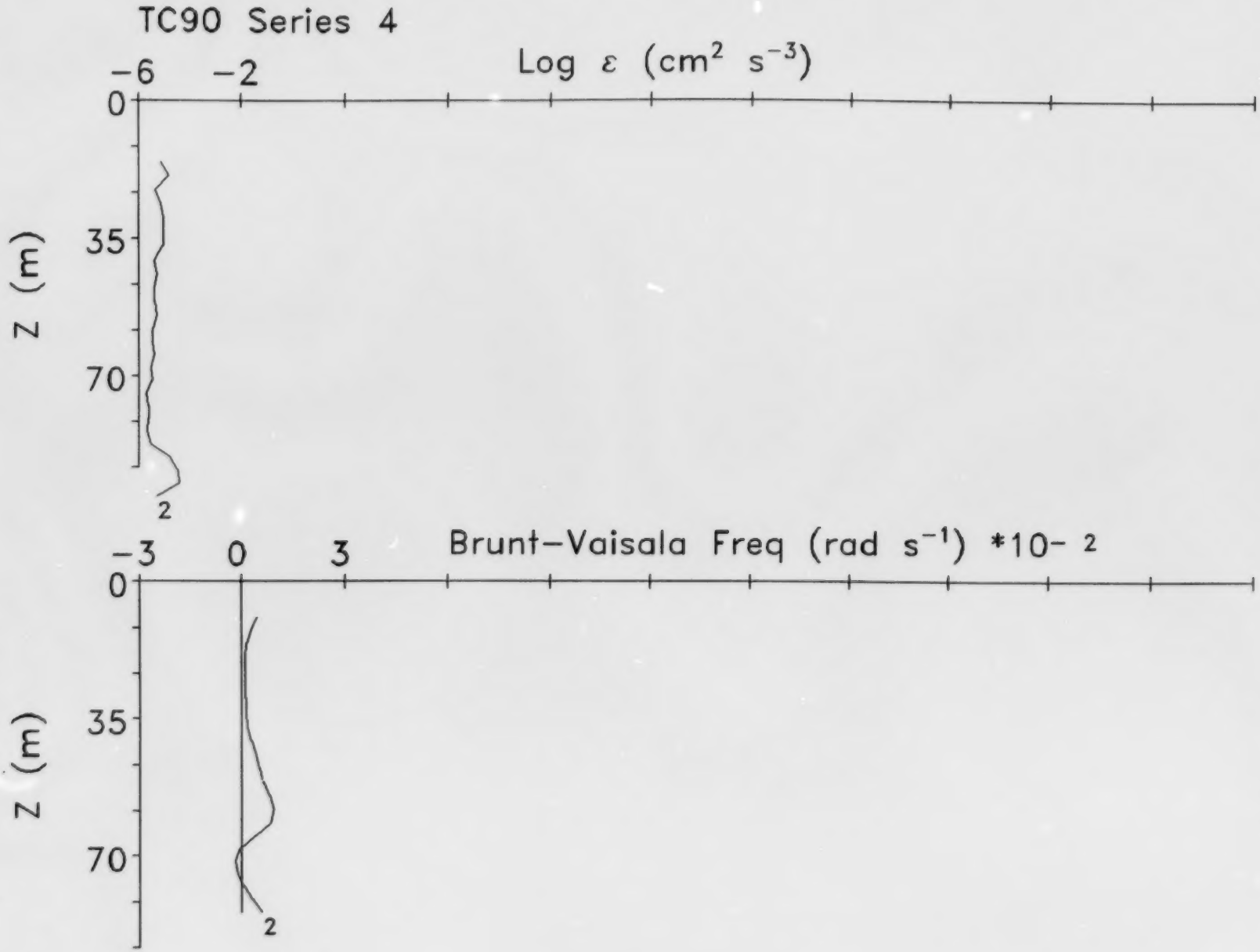

TC90 Series 1
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2

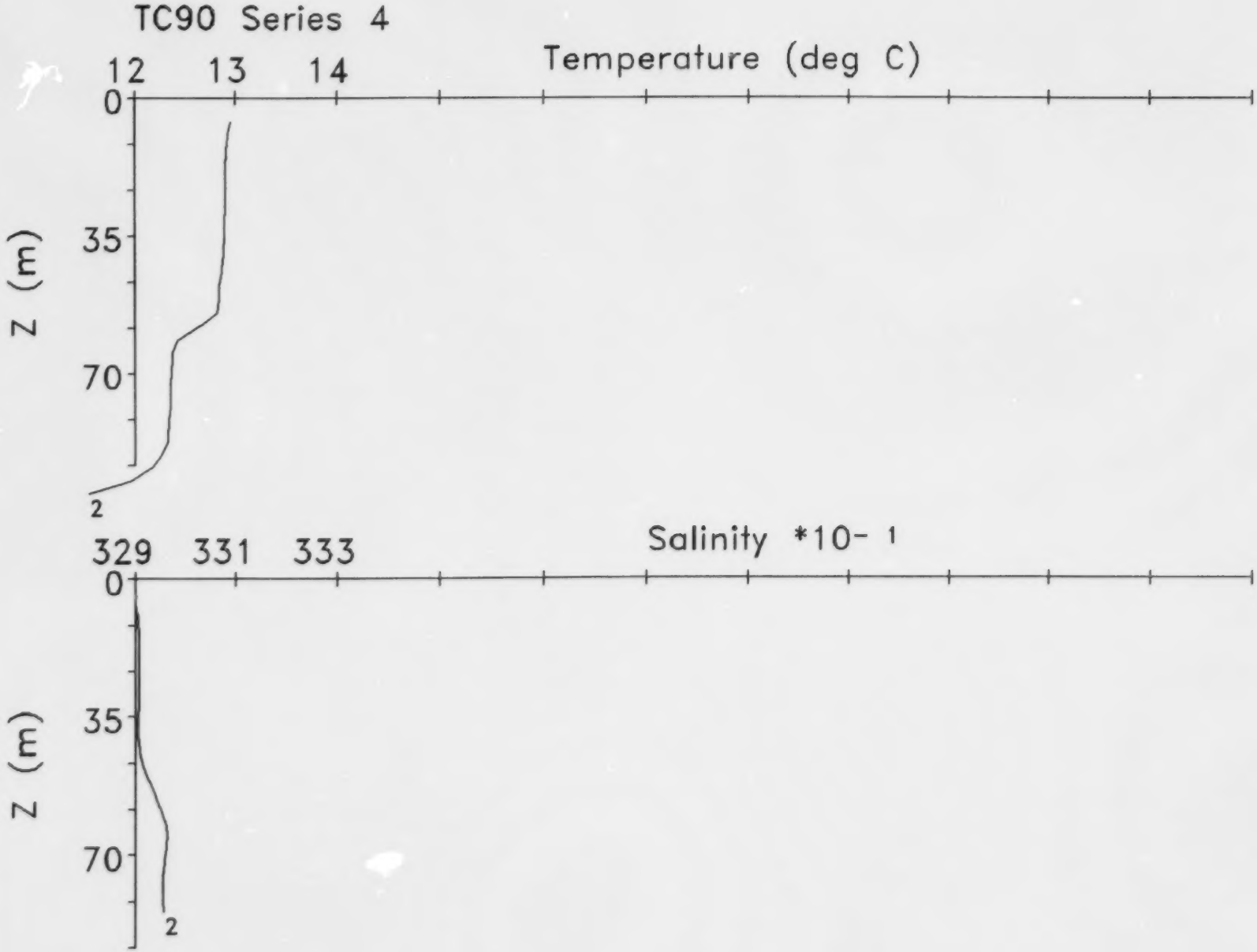

TC90 Series 2
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
3
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
35
70
Z (m)
3

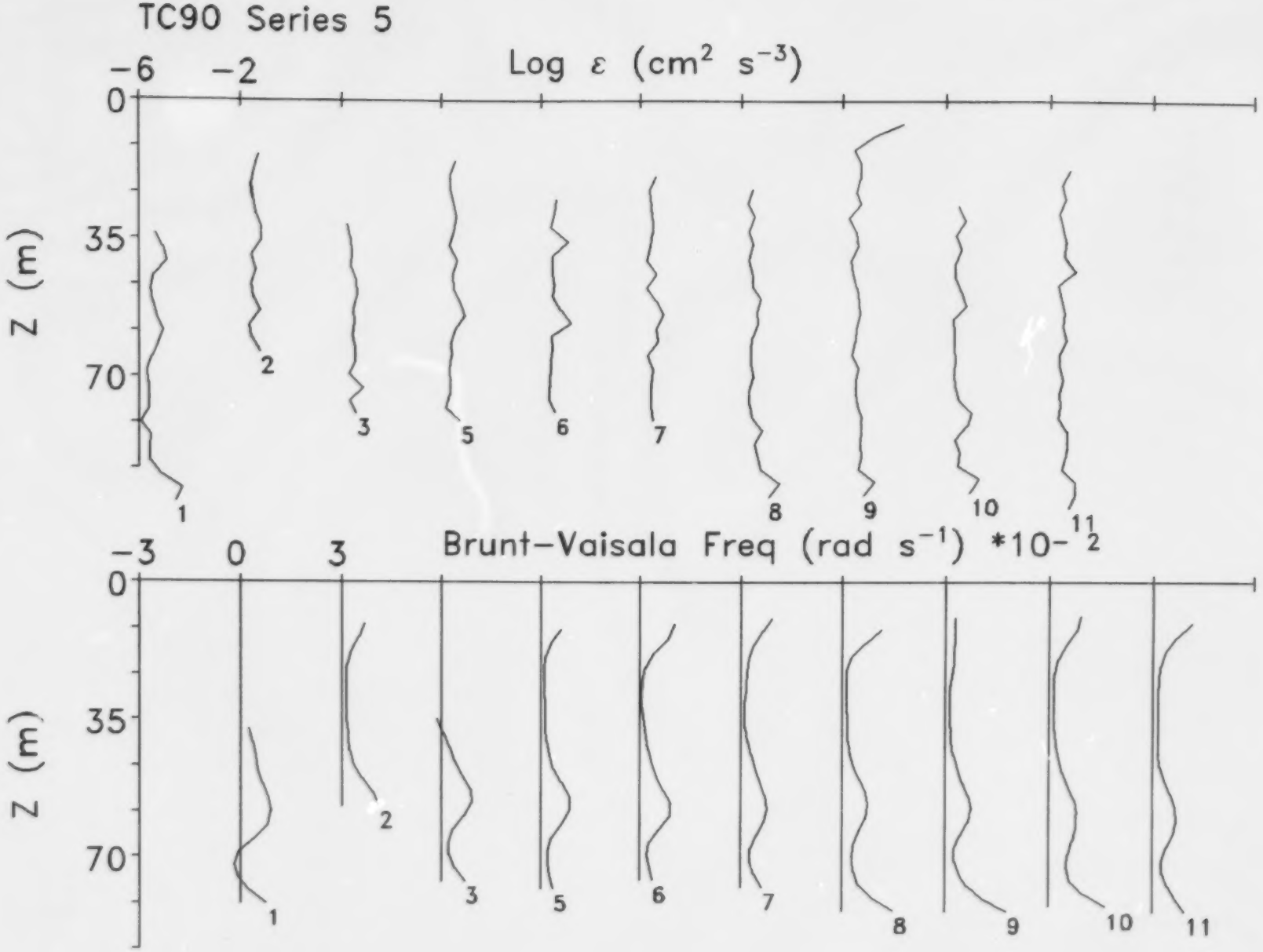

TC90 Series 2
12
13
14
Temperature (deg C)
0
35
70
Z (m)
3
329
331
333
Salinity *10- 1
0
35
70
Z (m)
3

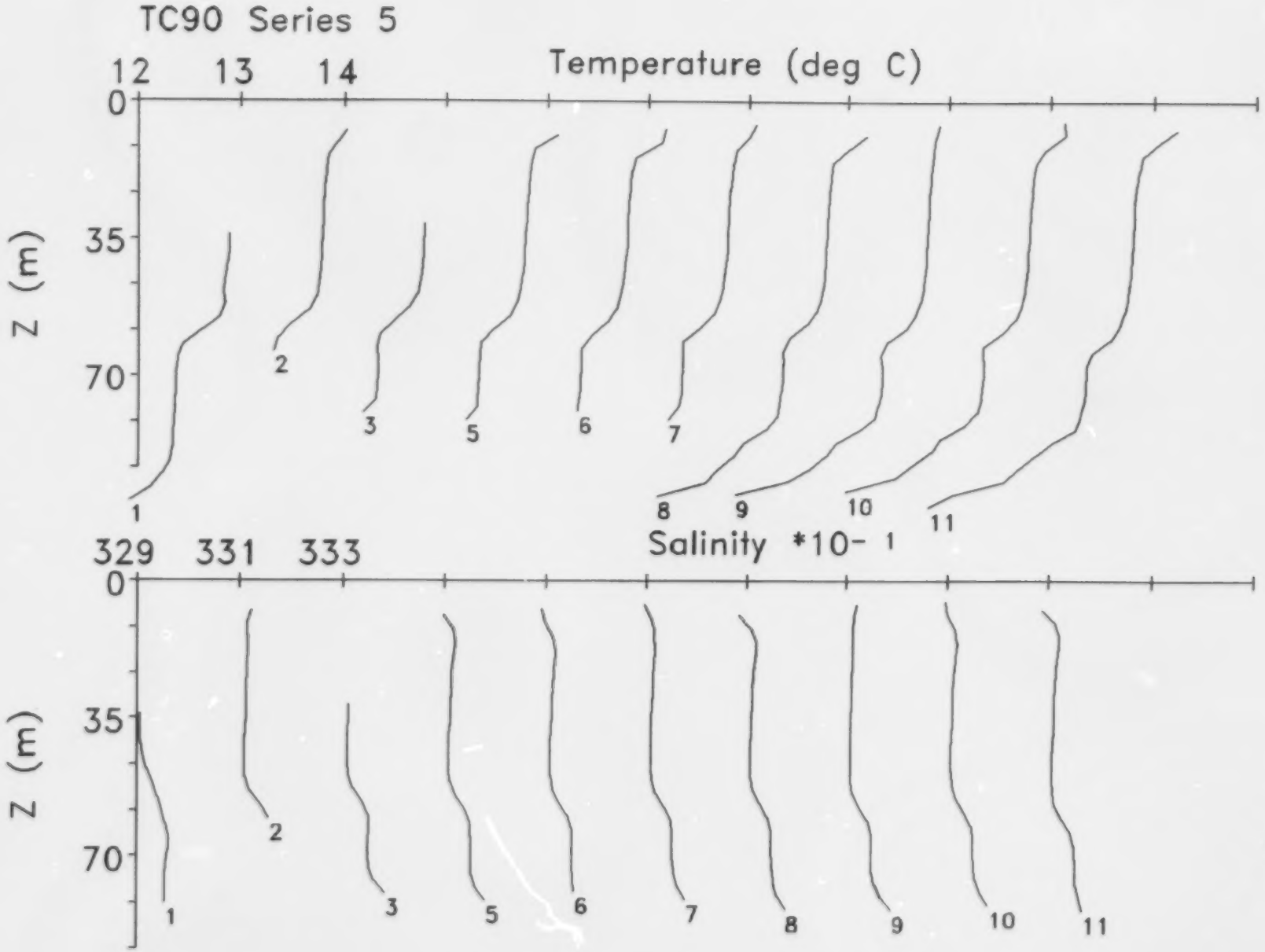

TC90 Series 3
Log ε (cm² s⁻³)
Brunt–Vaisala Freq (rad s⁻¹) *10⁻¹²
Z (m)
Z (m)
0
35
70
−6
−2
−3
0
3
1
2
3
4
5
6
10
12
13
14

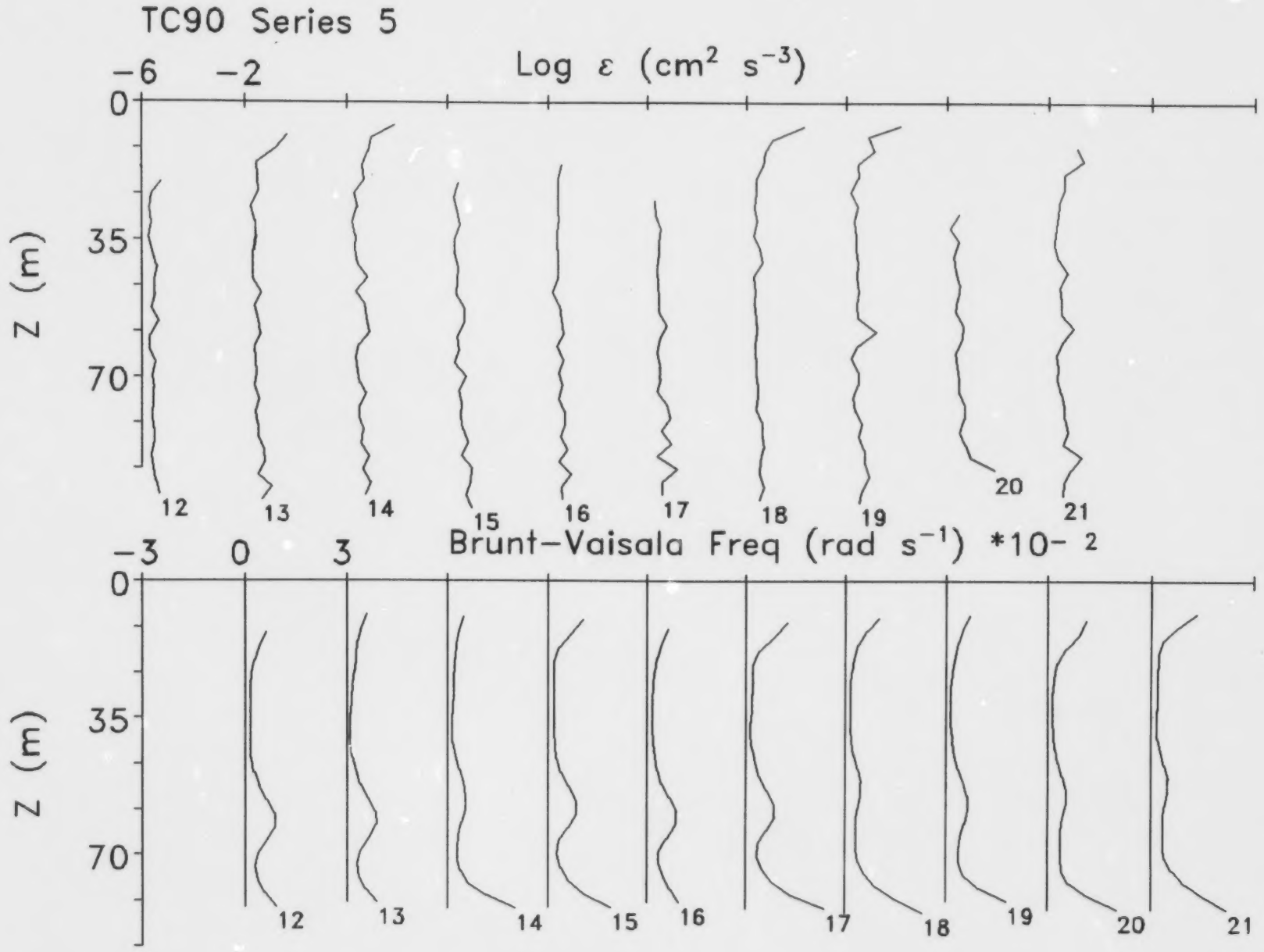

TC90 Series 3
Temperature (deg C)
12
13
14
0
35
70
Z (m)
1
2
3
4
5
6
10
12
13
14
Salinity *10- 1
329
331
333
0
35
70
Z (m)
1
2
3
4
5
6
10
12
13
14

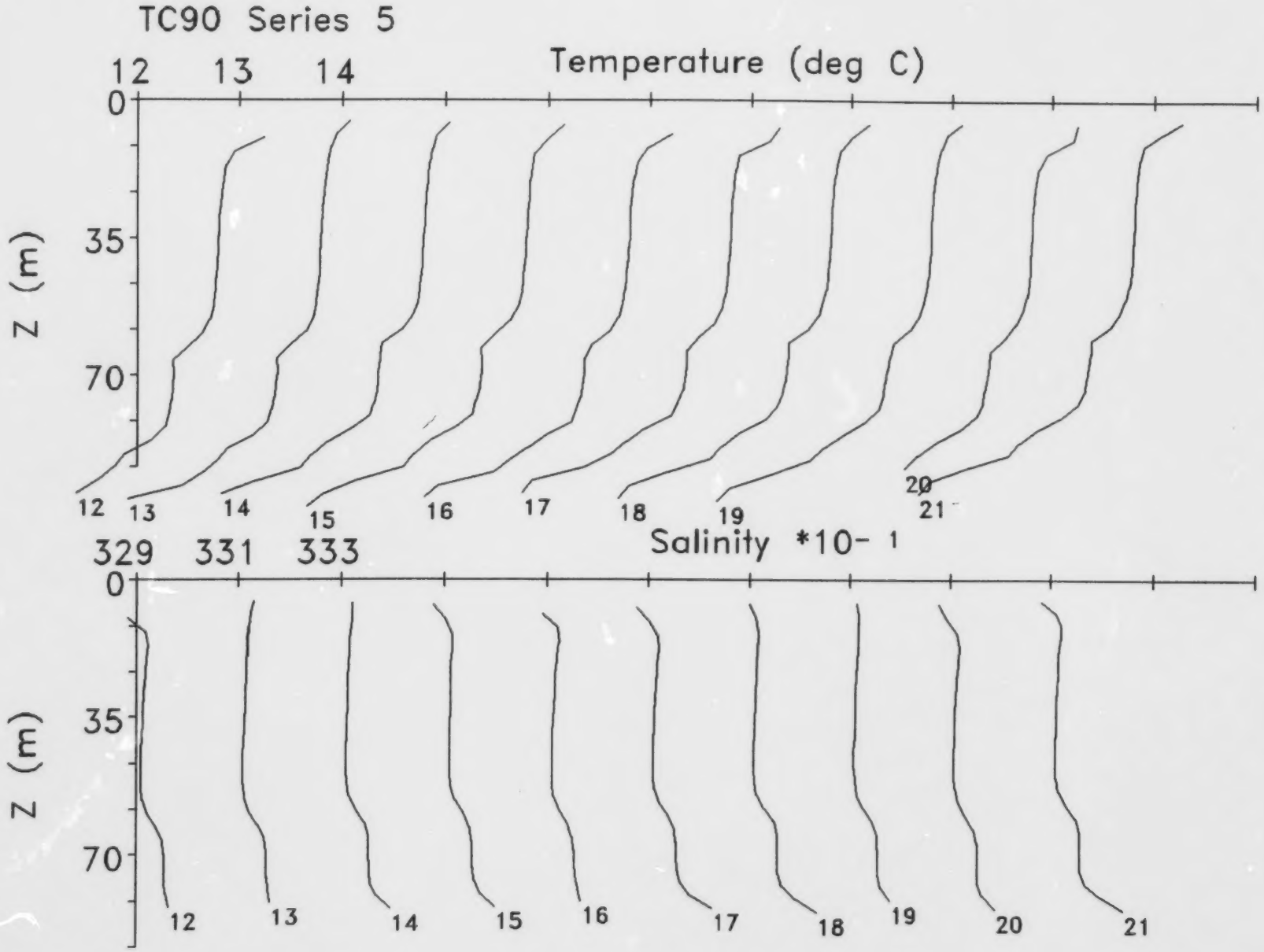

TC90 Series 4
Log ε (cm² s⁻³)
−6
−2
0
35
70
z (m)
2
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
z (m)
2

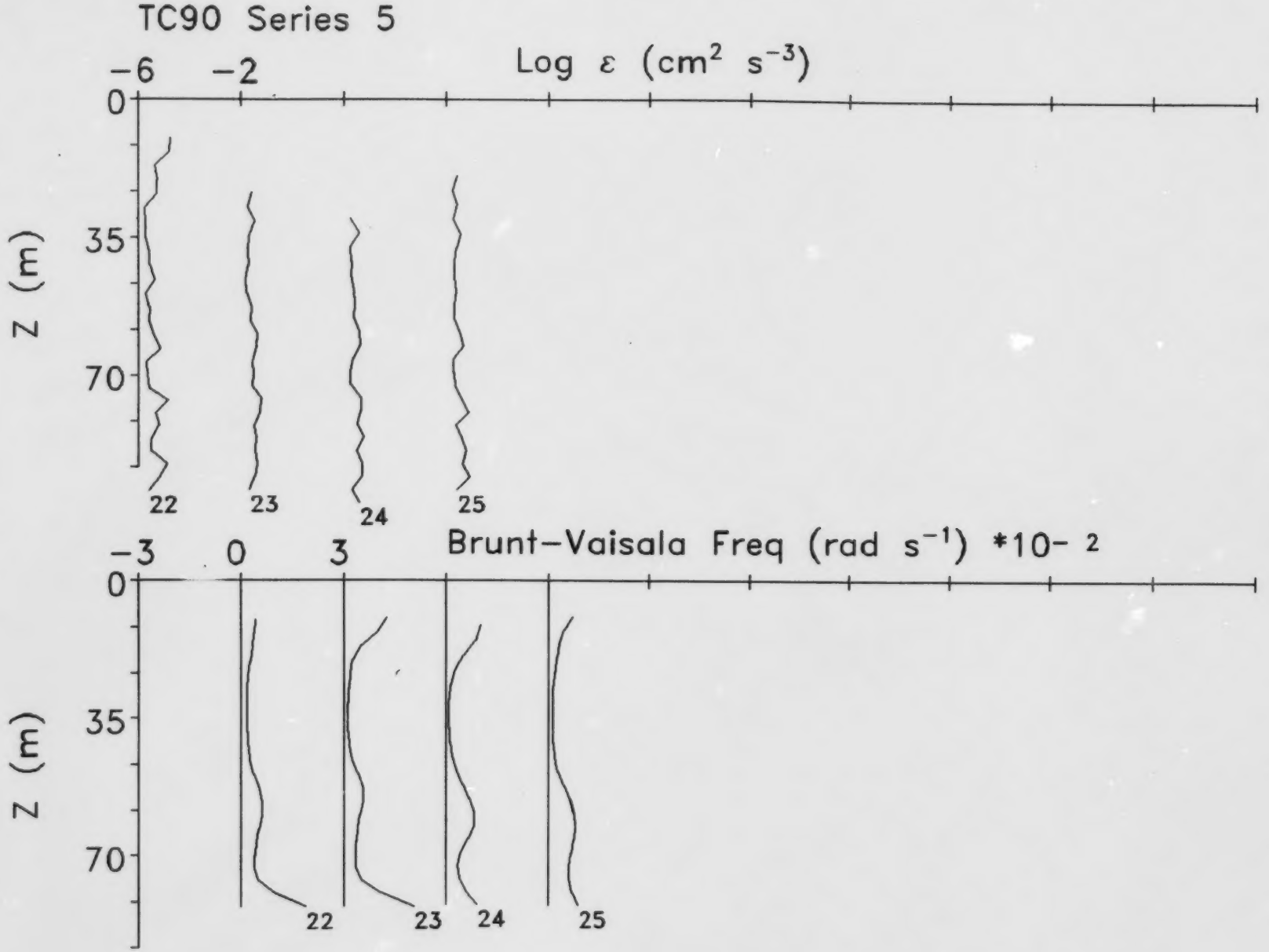

TC90 Series 4
Temperature (deg C)
12
13
14
0
35
70
Z (m)
2
Salinity *10- 1
329
331
333
0
35
70
Z (m)
2

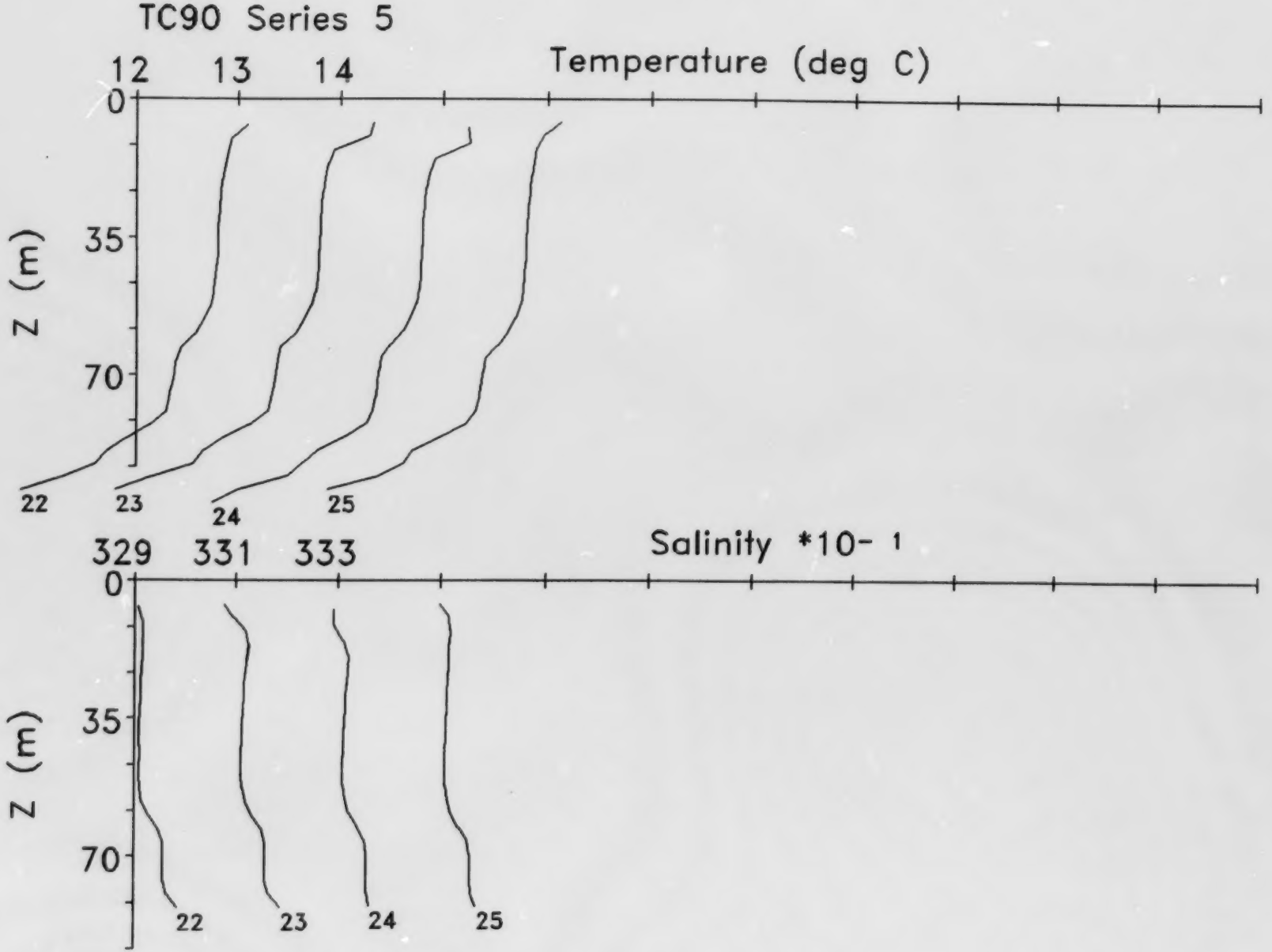

TC90 Series 5
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
5
6
7
8
9
10
11
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
35
70
Z (m)
1
2
3
5
6
7
8
9
10
11

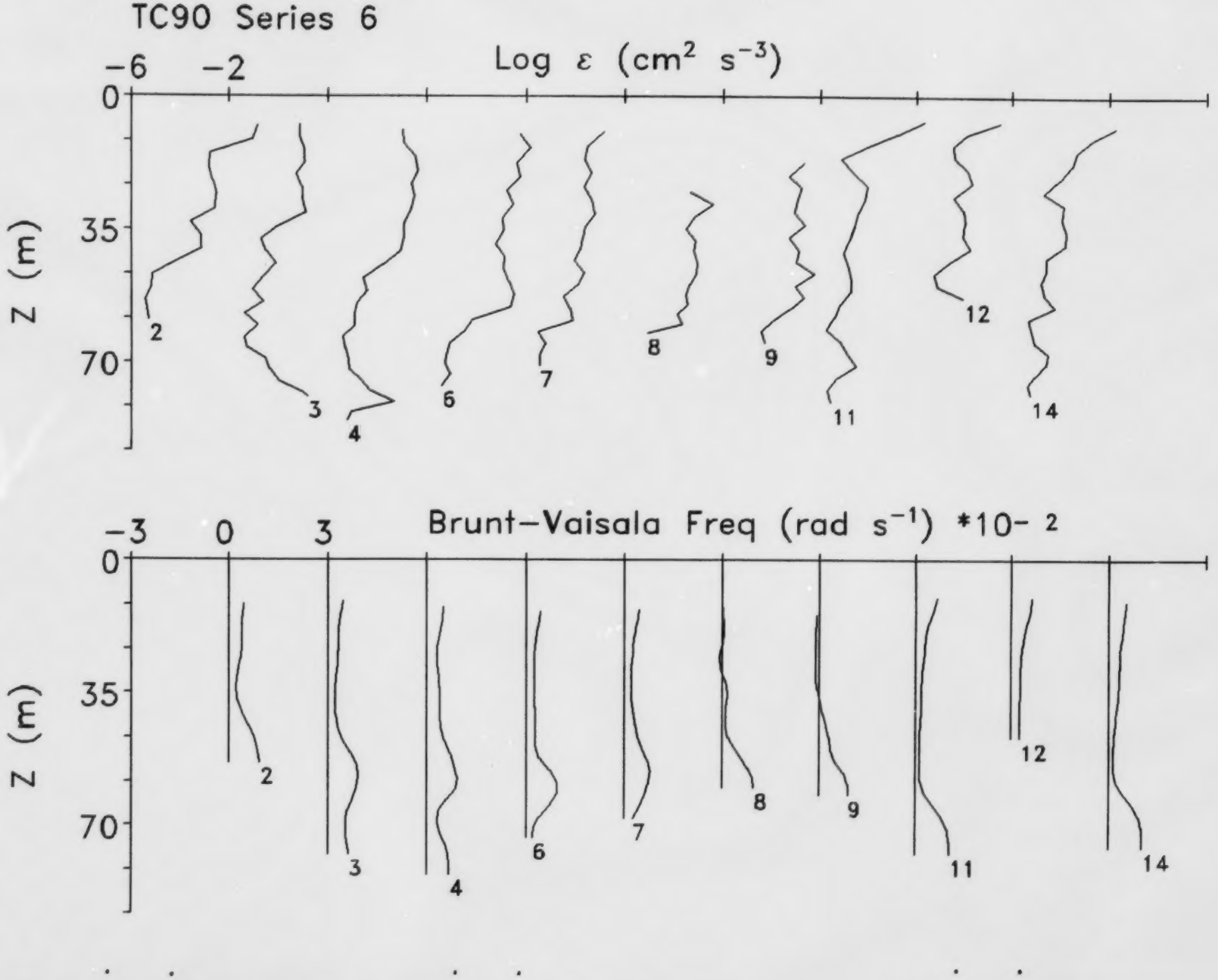

TC90 Series 5
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
5
6
7
8
9
10
11
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2
3
5
6
7
8
9
10
11

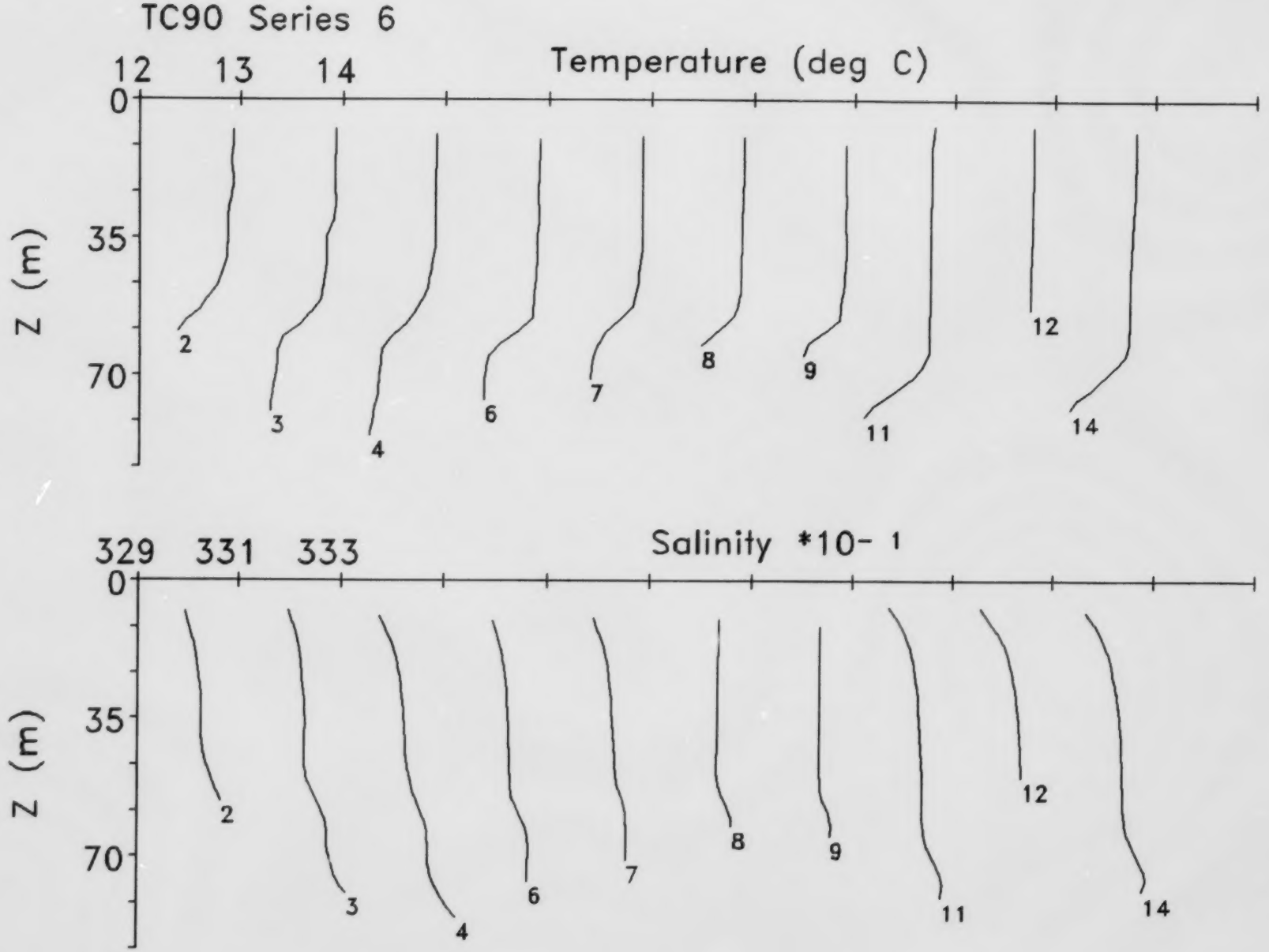

TC90 Series 5
Log ε (cm² s⁻³)
−6
−2
0
35
70
z (m)
12
13
14
15
16
17
18
19
20
21
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
35
70
z (m)
12
13
14
15
16
17
18
19
20
21

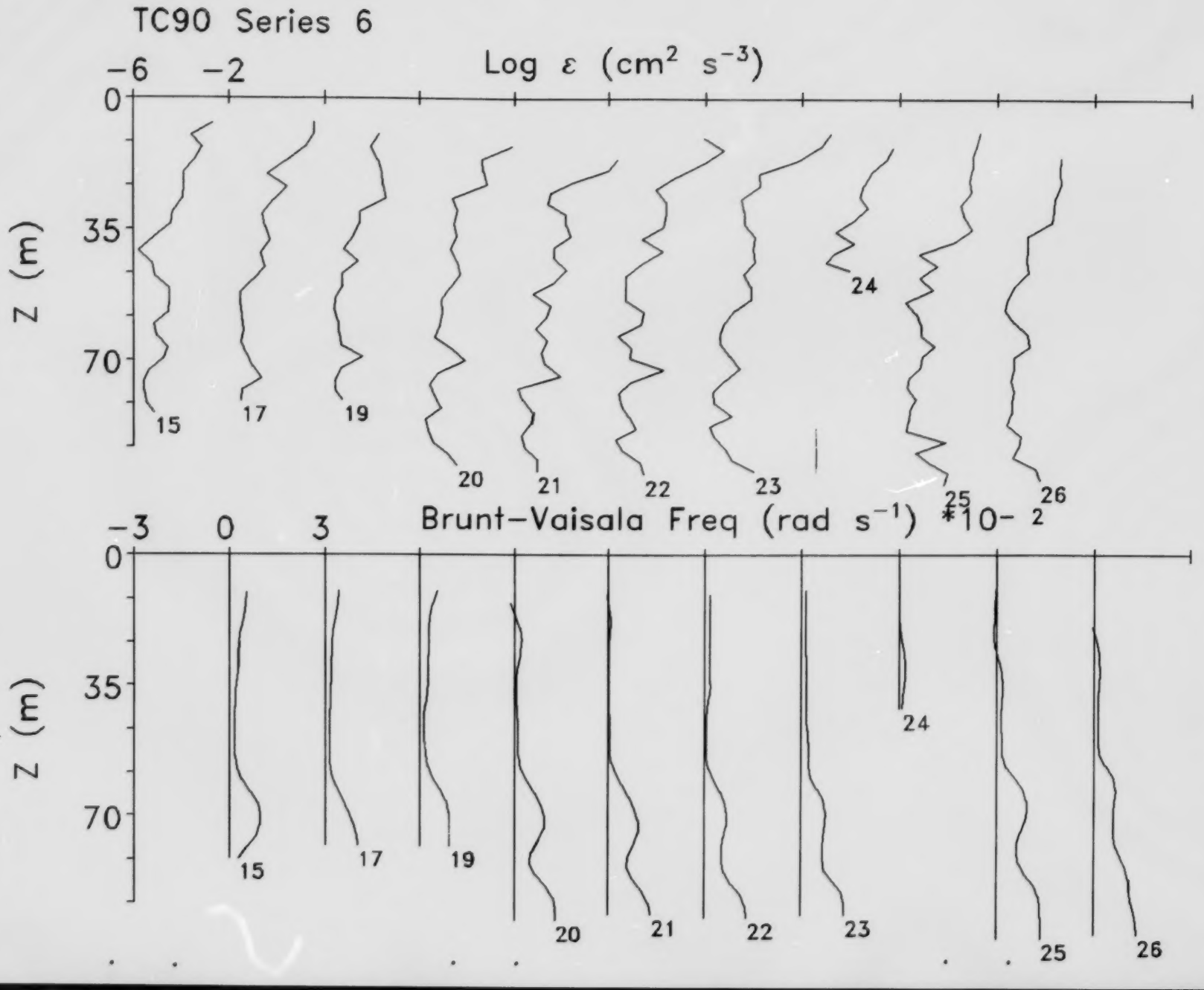

TC90 Series 5
Temperature (deg C)
12
13
14
0
35
70
Z (m)
12
13
14
15
16
17
18
19
20
21
Salinity *10- 1
329
331
333
0
35
70
Z (m)
12
13
14
15
16
17
18
19
20
21

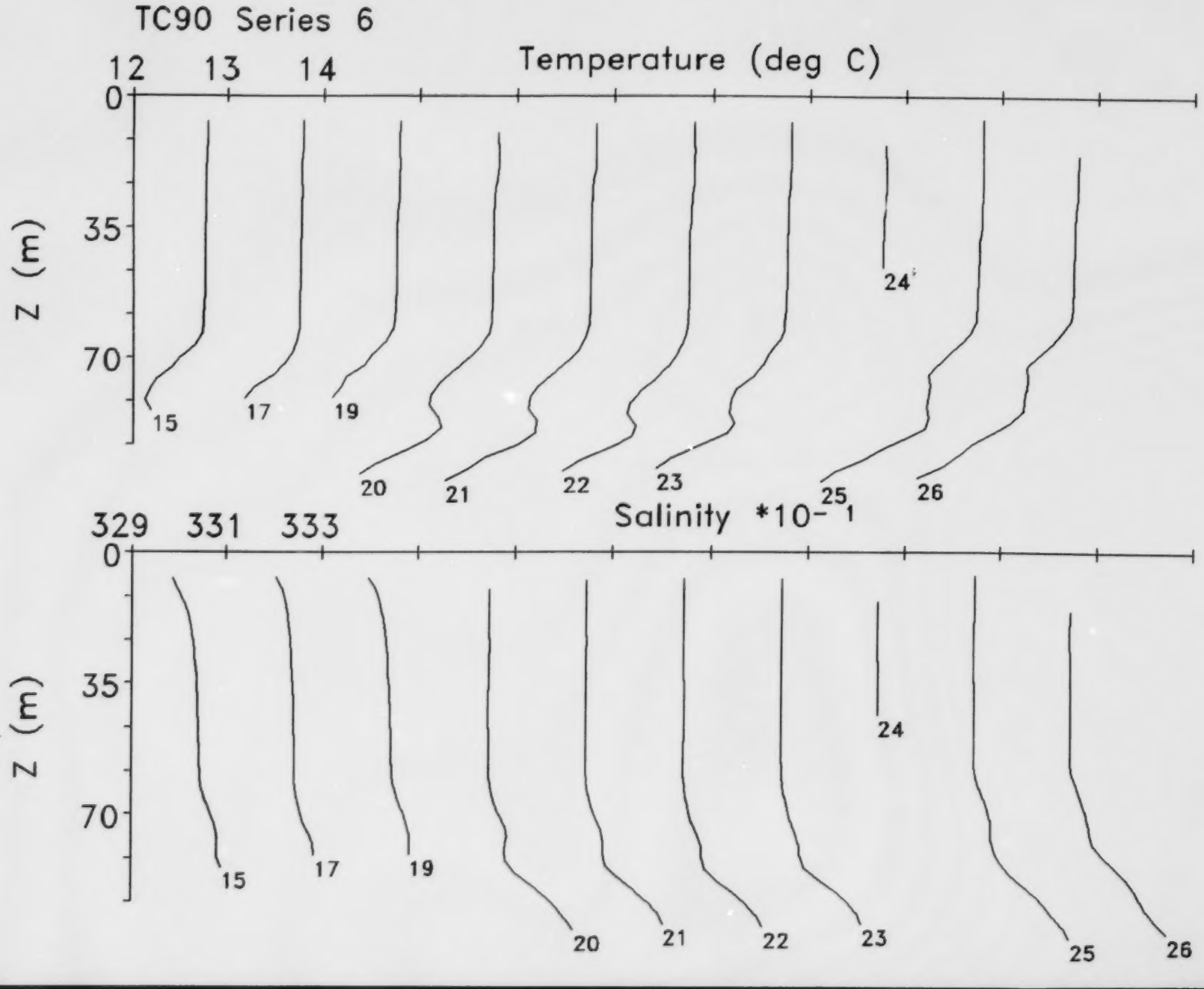

TC90 Series 5
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
22
23
24
25
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
22
23
24
25

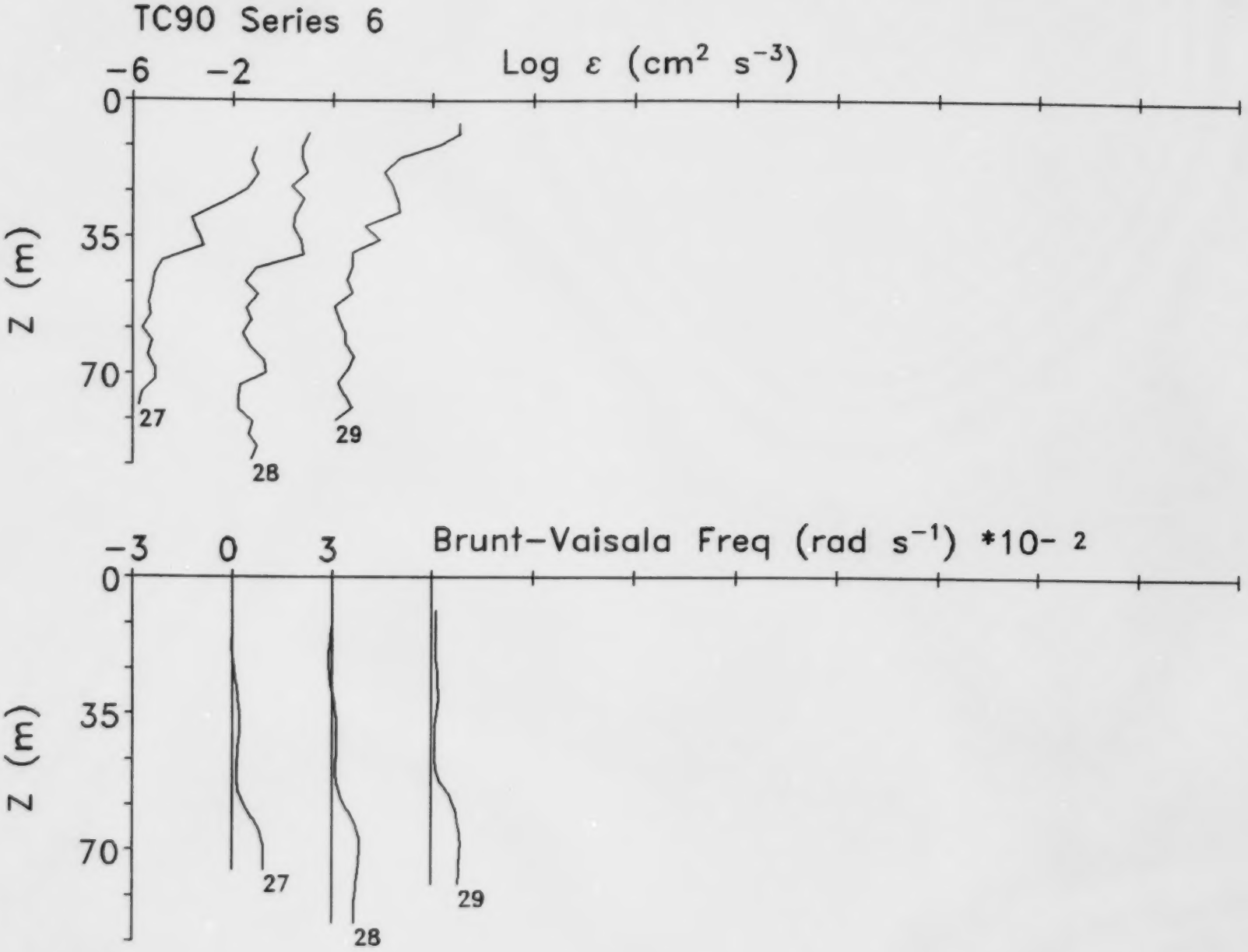

TC90 Series 5
12
13
14
Temperature (deg C)
0
35
70
Z (m)
22
23
24
25
329
331
333
Salinity *10- 1
0
35
70
Z (m)
22
23
24
25

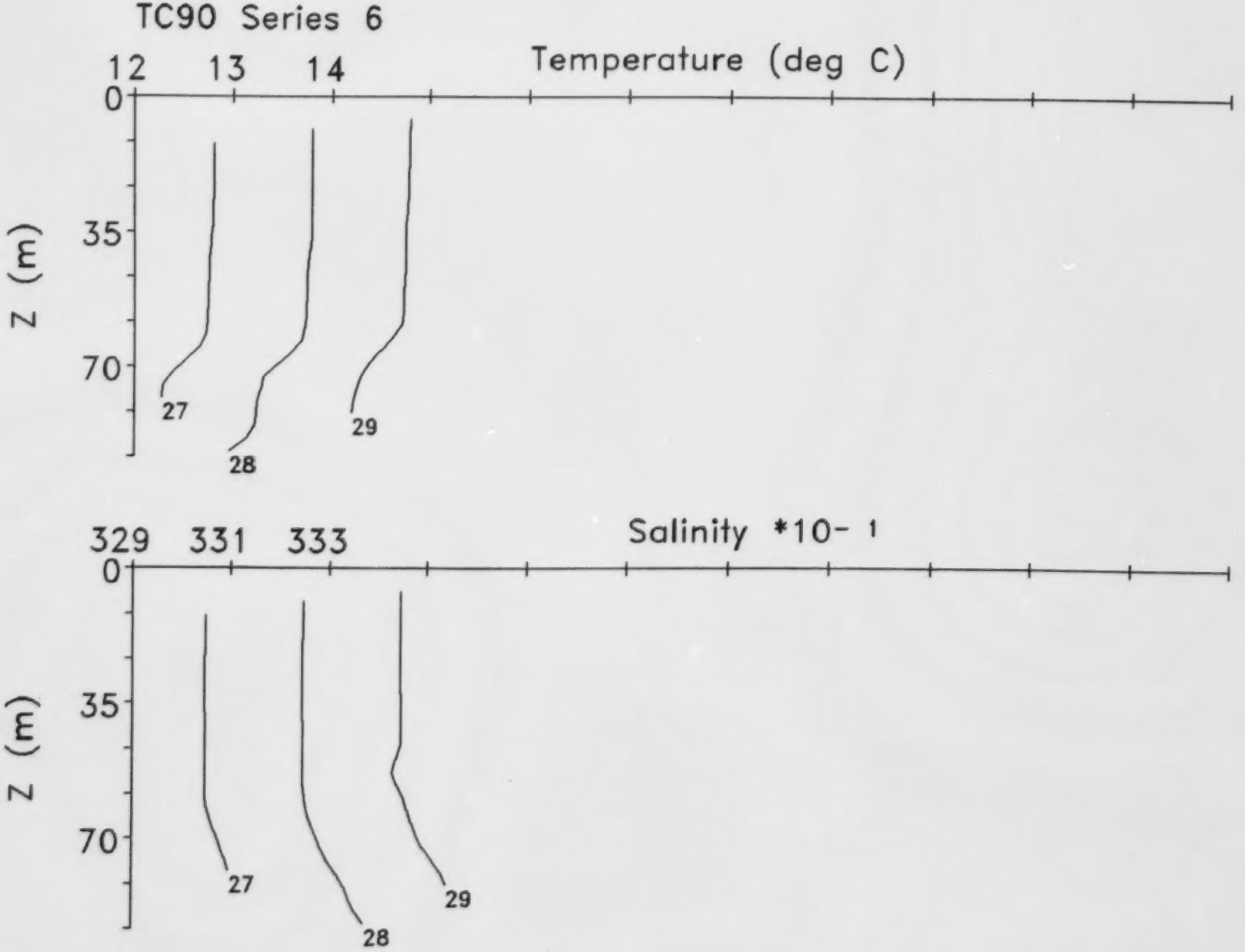

TC90 Series 6
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
2
3
4
6
7
8
9
11
12
14
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
2
3
4
6
7
8
9
11
12
14

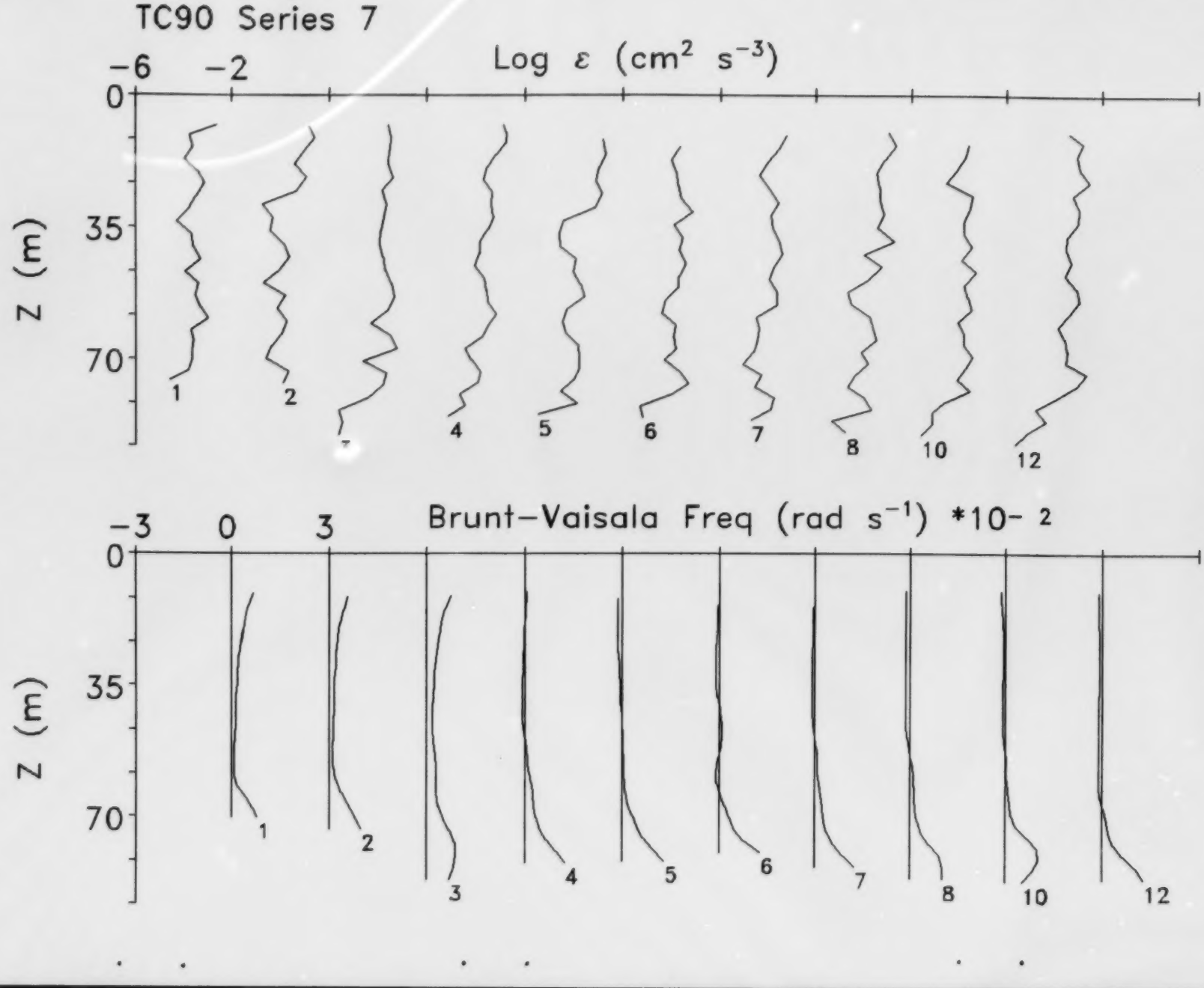

TC90 Series 6
12
13
14
Temperature (deg C)
0
35
70
Z (m)
2
3
4
6
7
8
9
11
12
14
329
331
333
Salinity *10- 1
0
35
70
Z (m)
2
3
4
6
7
8
9
11
12
14

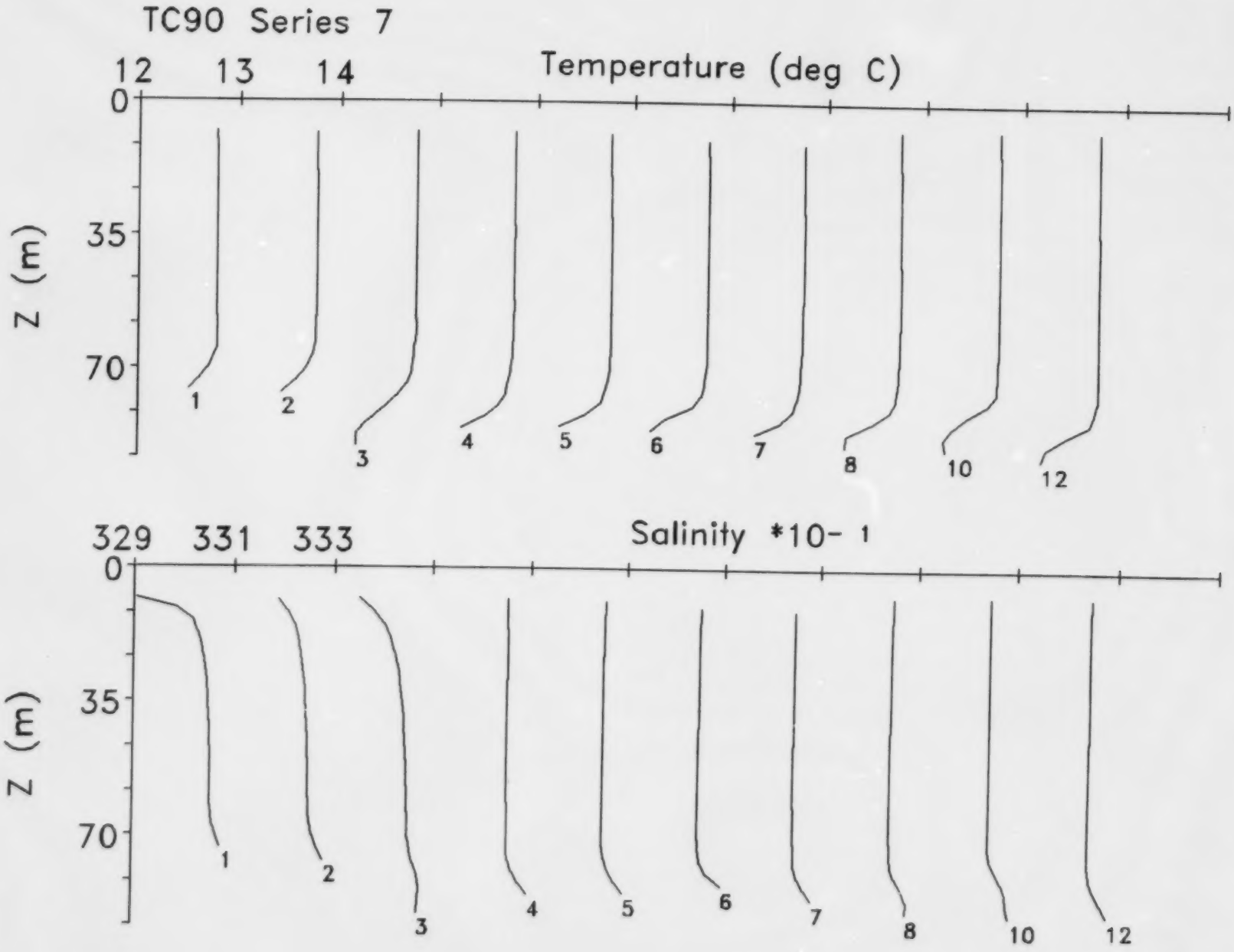

TC90 Series 6
Log ε (cm² s⁻³)
−6
−2
0
35
70
z (m)
15
17
19
20
21
22
23
24
25
26
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
35
70
z (m)
15
17
19
20
21
22
23
24
25
26


TC90 Series 6
12
13
14
Temperature (deg C)
0
35
70
Z (m)
15
17
19
20
21
22
23
24
25
26
329
331
333
Salinity *10⁻¹
0
35
70
Z (m)
15
17
19
20
21
22
23
24
25
26


TC90 Series 6
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
27
28
29
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
27
28
29


TC90 Series 6
12
13
14
Temperature (deg C)
0
35
70
Z (m)
27
28
29
329
331
333
Salinity *10- 1
0
35
70
Z (m)
27
28
29


TC90 Series 7
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
4
5
6
7
8
10
12
Brunt−Vaisala Freq (rad s⁻¹) *10- 2
−3
0
3
0
35
70
Z (m)
1
2
3
4
5
6
7
8
10
12


TC90 Series 7
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
4
5
6
7
8
10
12
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2
3
4
5
6
7
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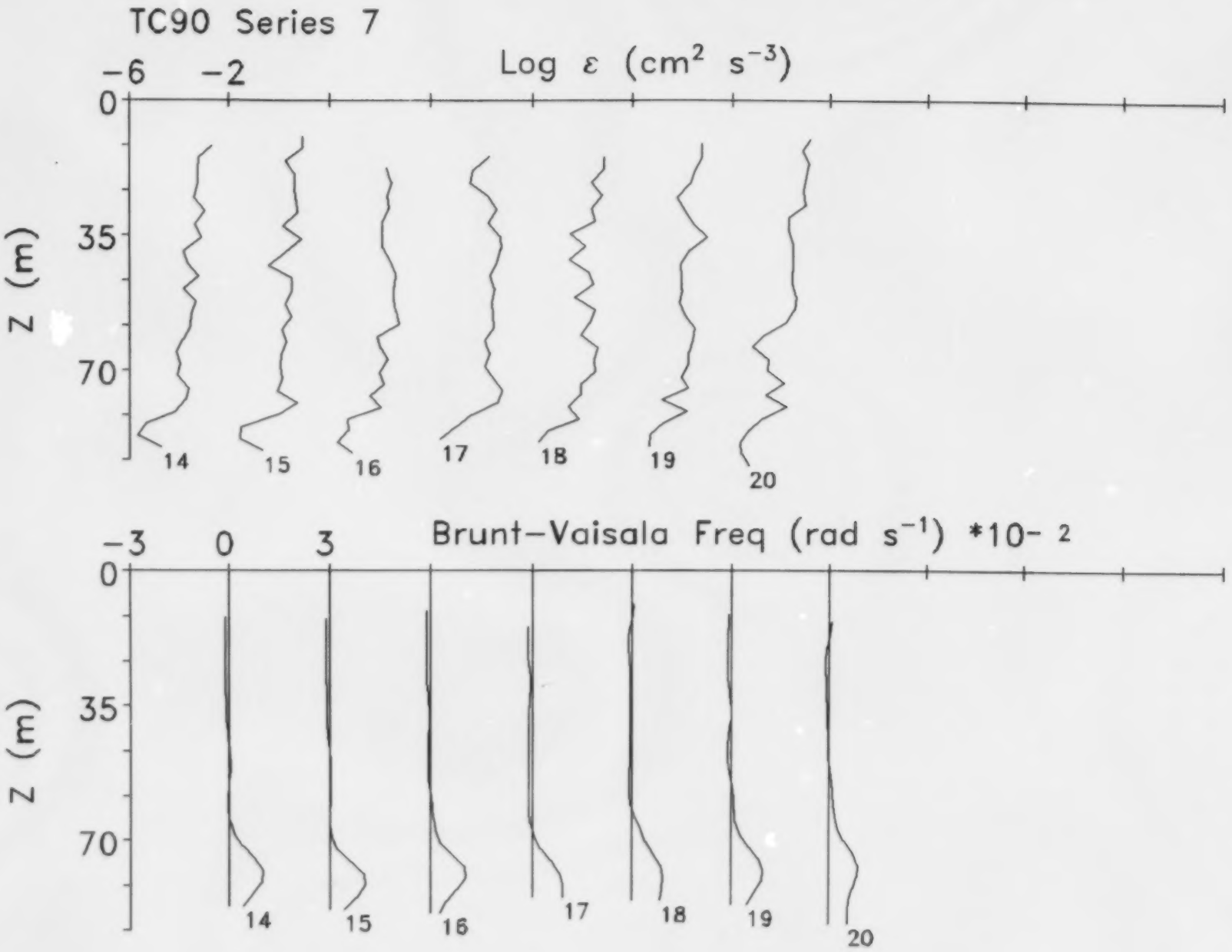
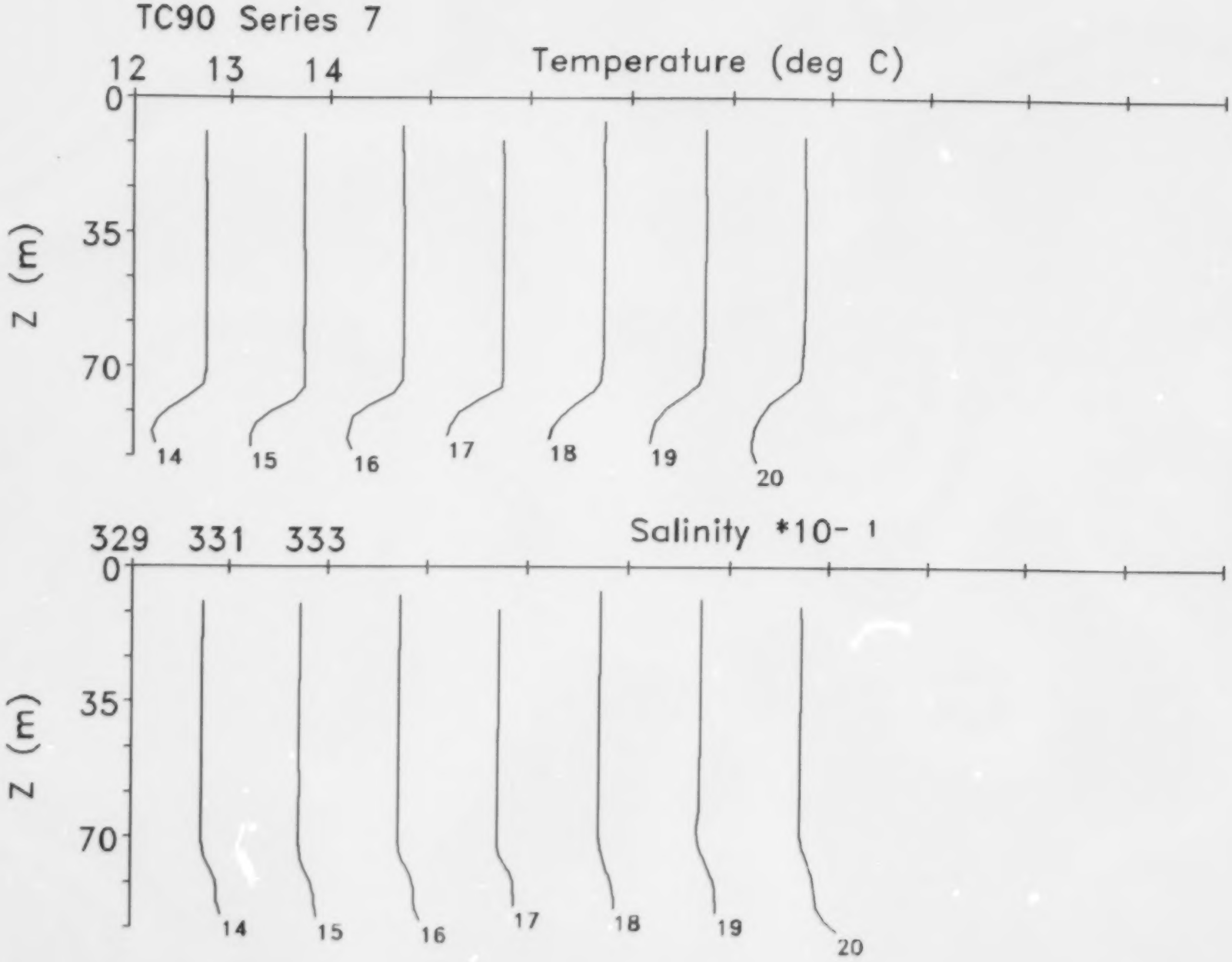
12


TC90 Series 7
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
14
15
16
17
18
19
20
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ 2
−3
0
3
0
35
70
Z (m)
14
15
16
17
18
19
20


TC90 Series 7
Temperature (deg C)
12
13
14
0
35
70
Z (m)
14
15
16
17
18
19
20
Salinity *10- 1
329
331
333
0
35
70
Z (m)
14
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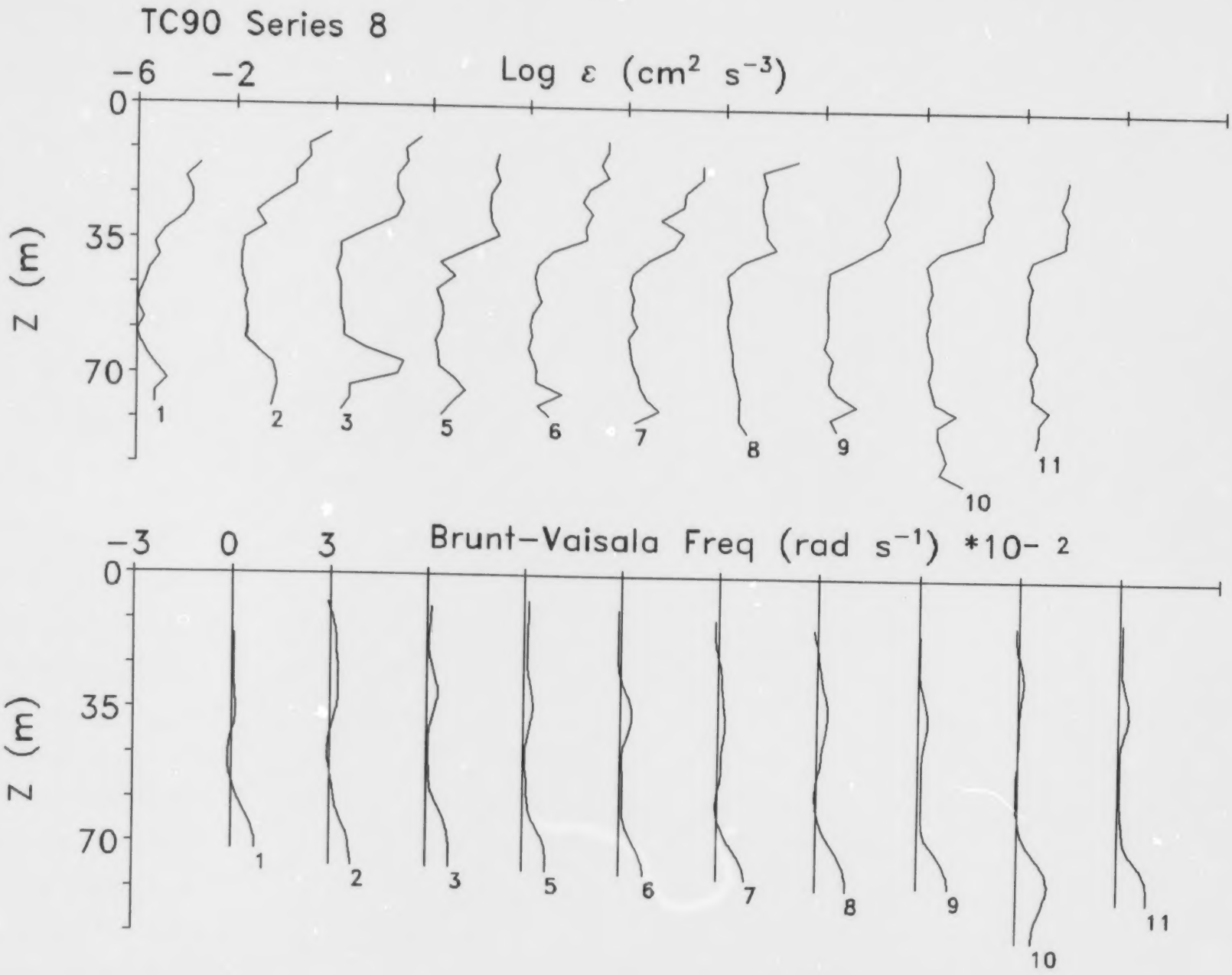
18
19
20


TC90 Series 8
−6
−2
Log ε (cm² s⁻³)
0
35
70
Z (m)
1
2
3
5
6
7
8
9
10
11
−3
0
3
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
0
35
70
Z (m)
1
2
3
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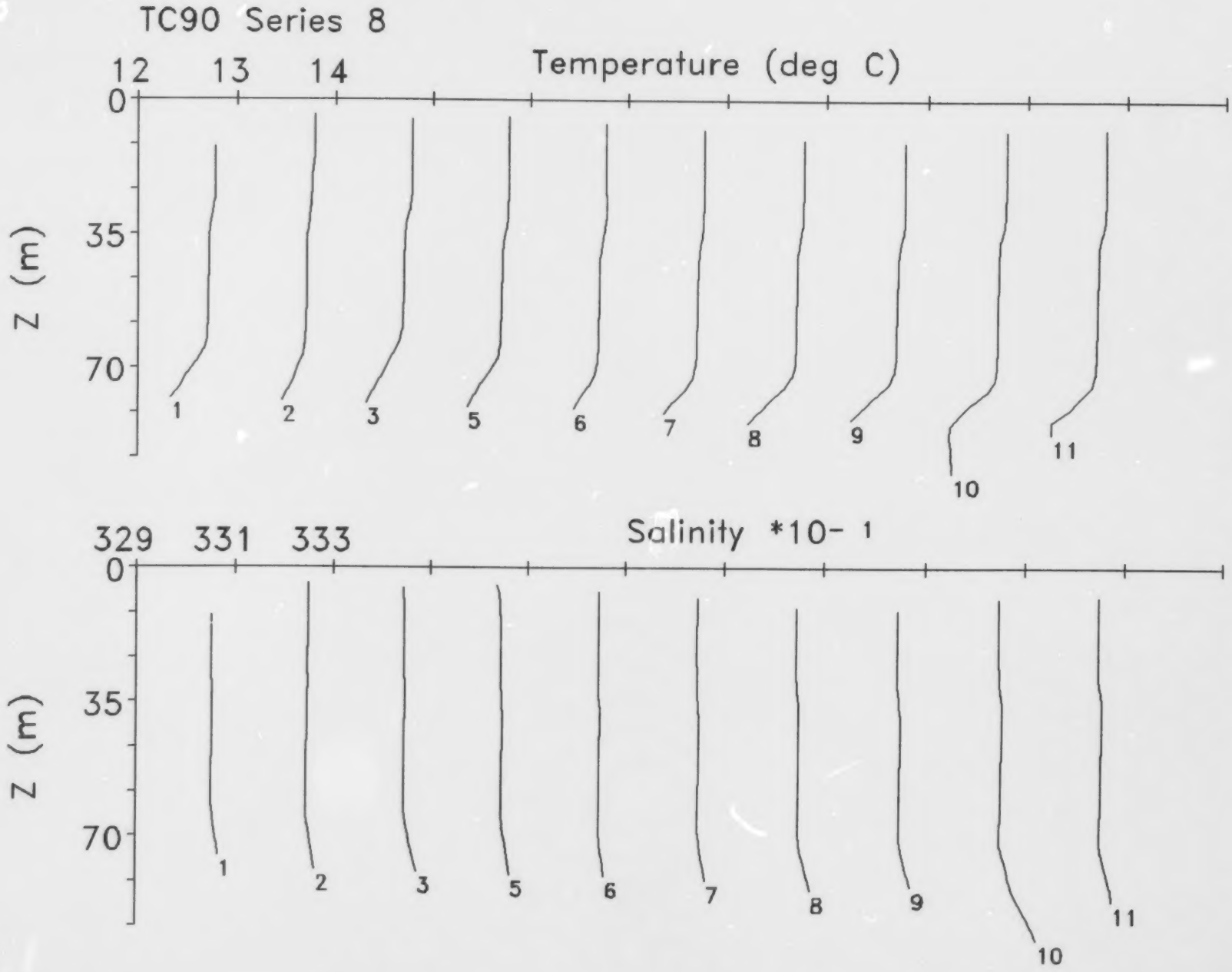
6
7
8
9
10
11


TC90 Series 8
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
5
6
7
8
9
10
11
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2
3
5
6
7
8
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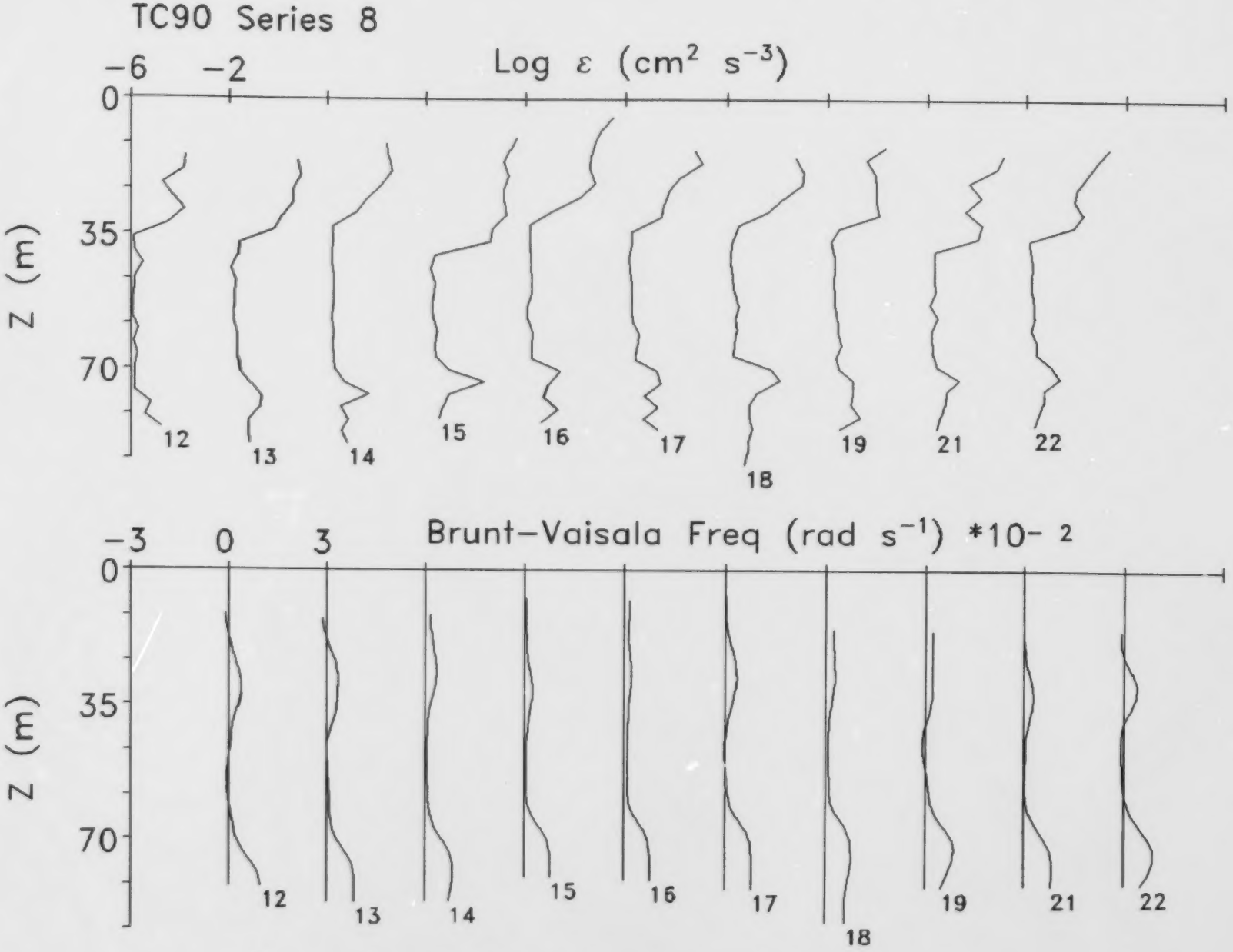
11


TC90 Series 8
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
12
13
14
15
16
17
18
19
21
22
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
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3
0
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70
Z (m)
12
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14
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18
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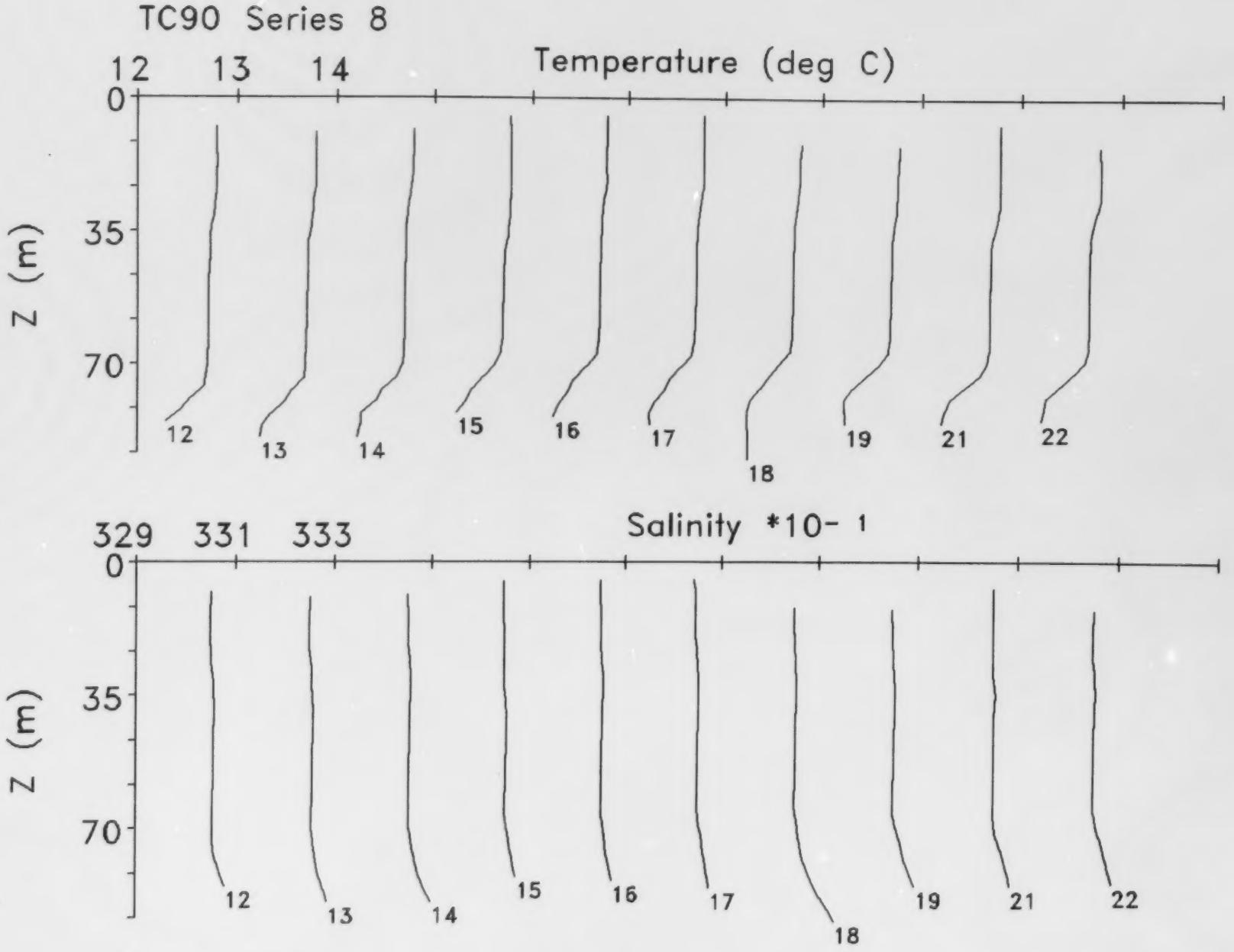
21
22


TC90 Series 8
12
13
14
Temperature (deg C)
0
35
70
Z (m)
12
13
14
15
16
17
18
19
21
22
329
331
333
Salinity *10- 1
0
35
70
Z (m)
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14
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18
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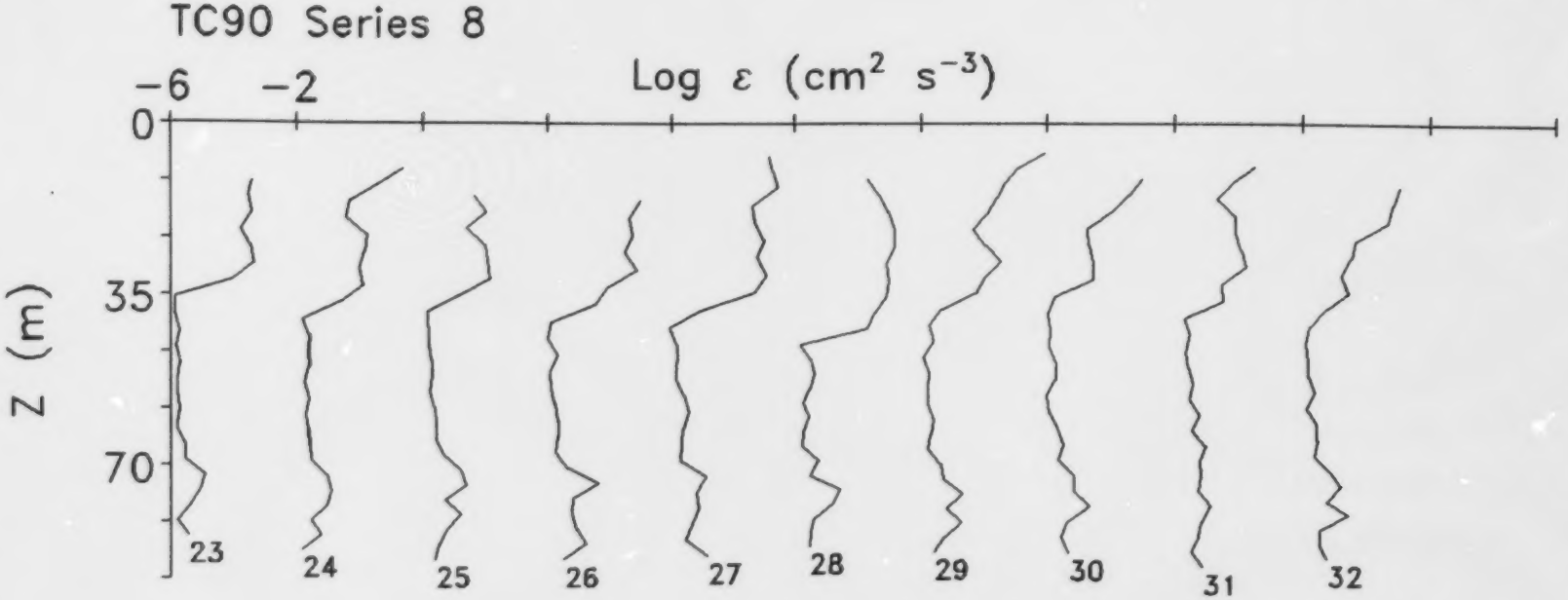
21
22


TC90 Series 8
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
23
24
25
26
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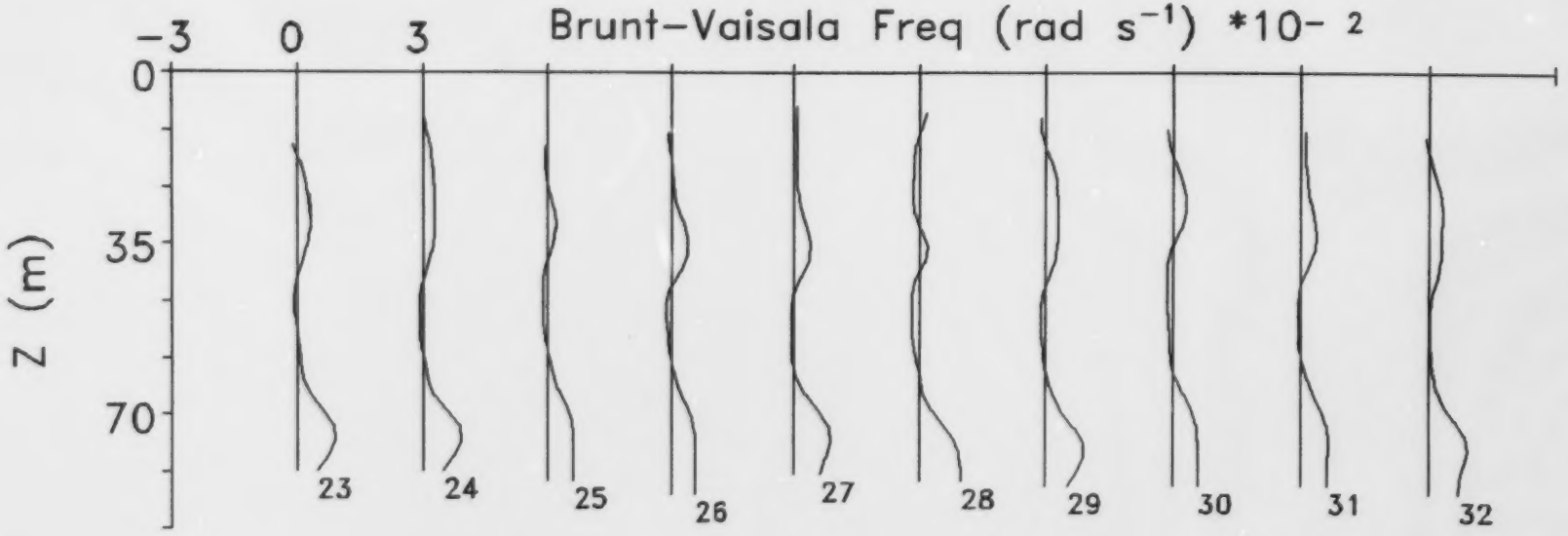
29
30
31
32


Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
35
70
Z (m)
23
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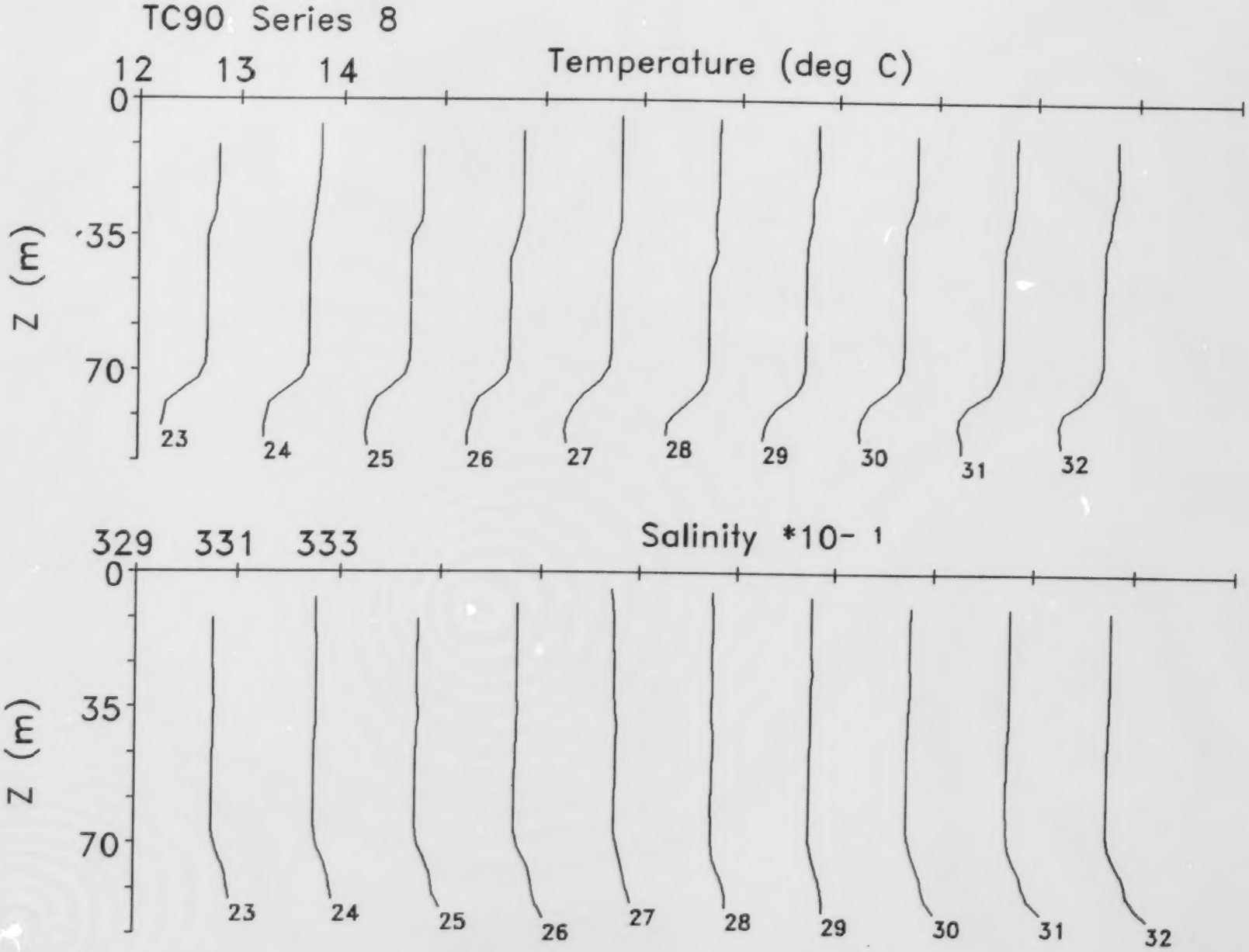
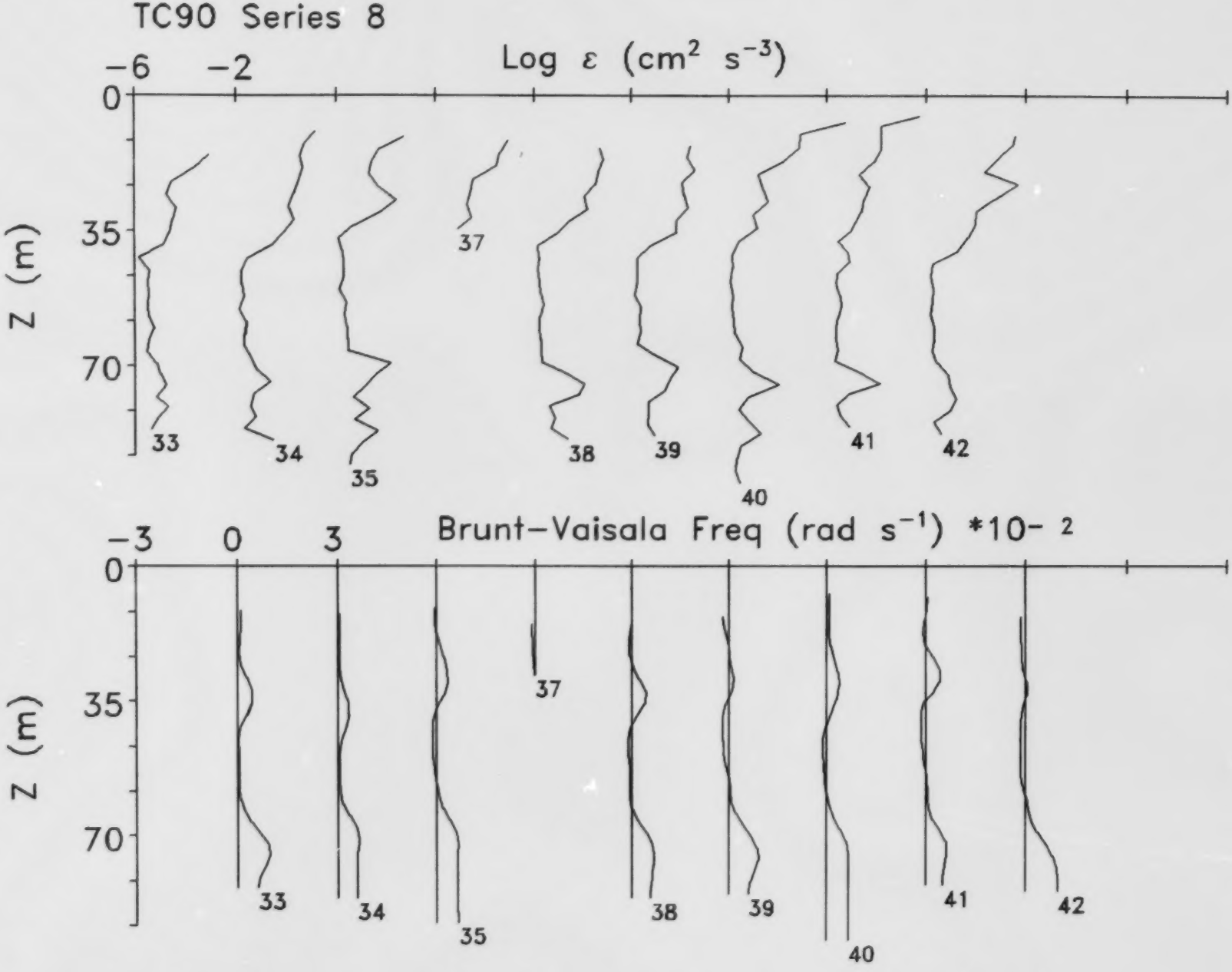
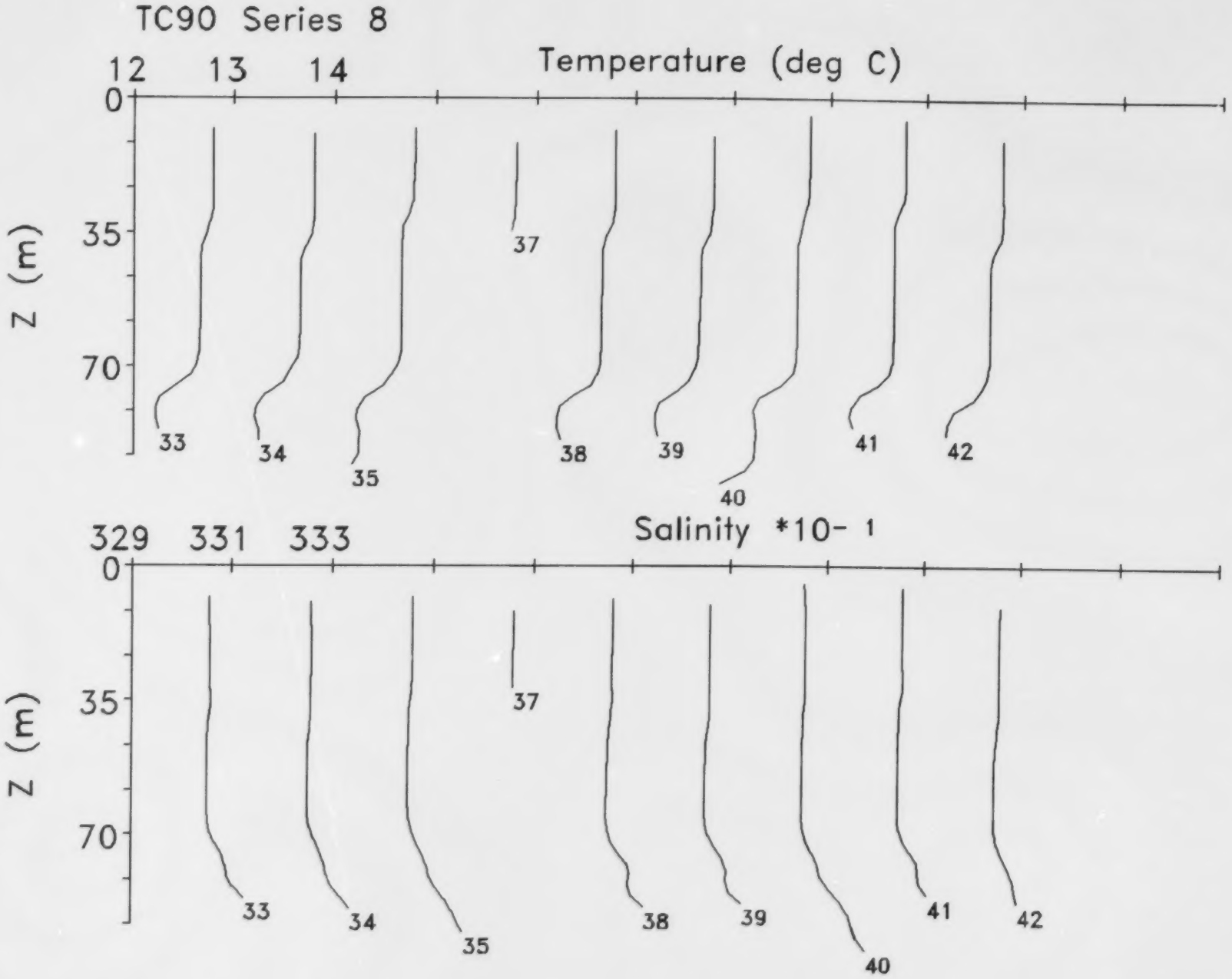
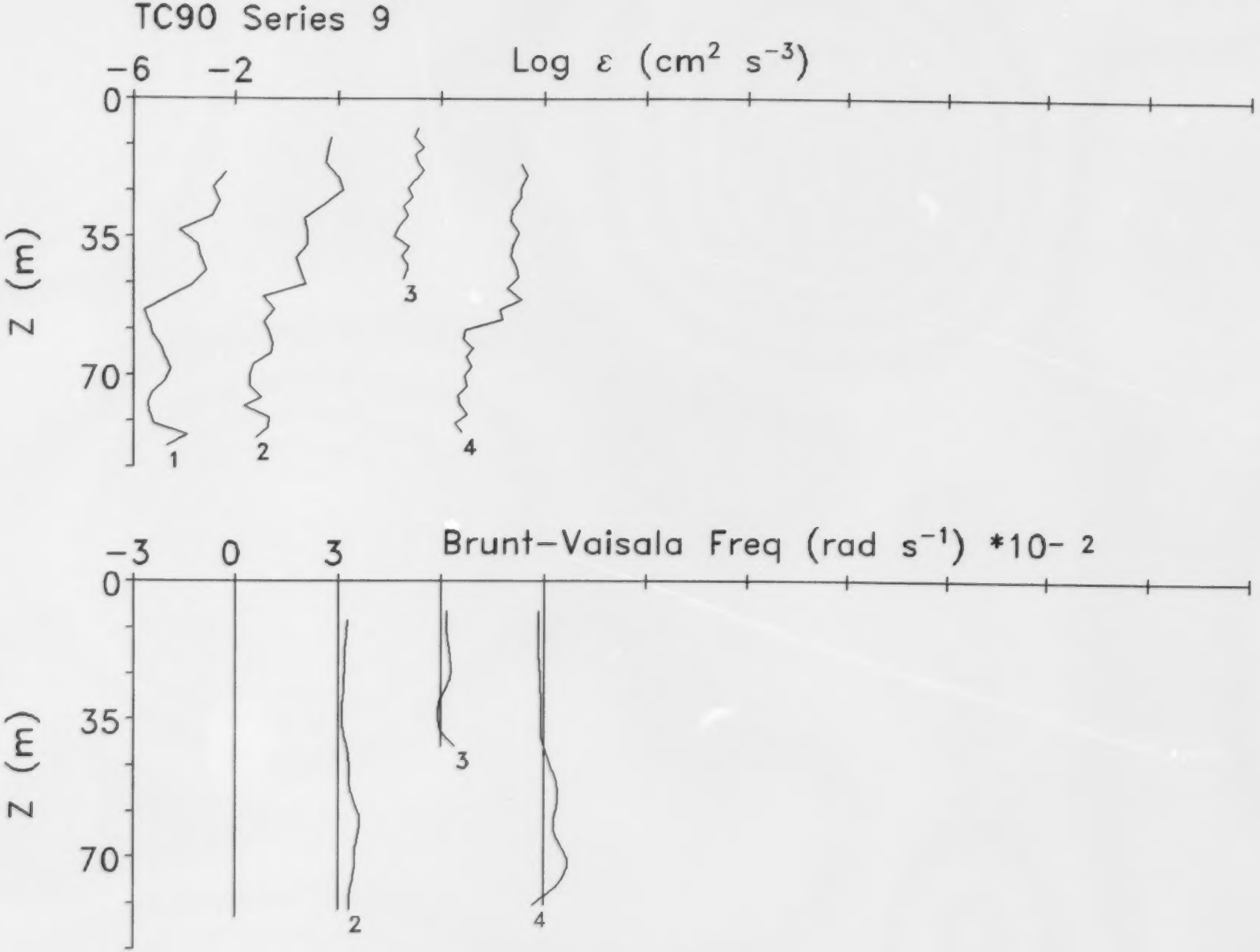
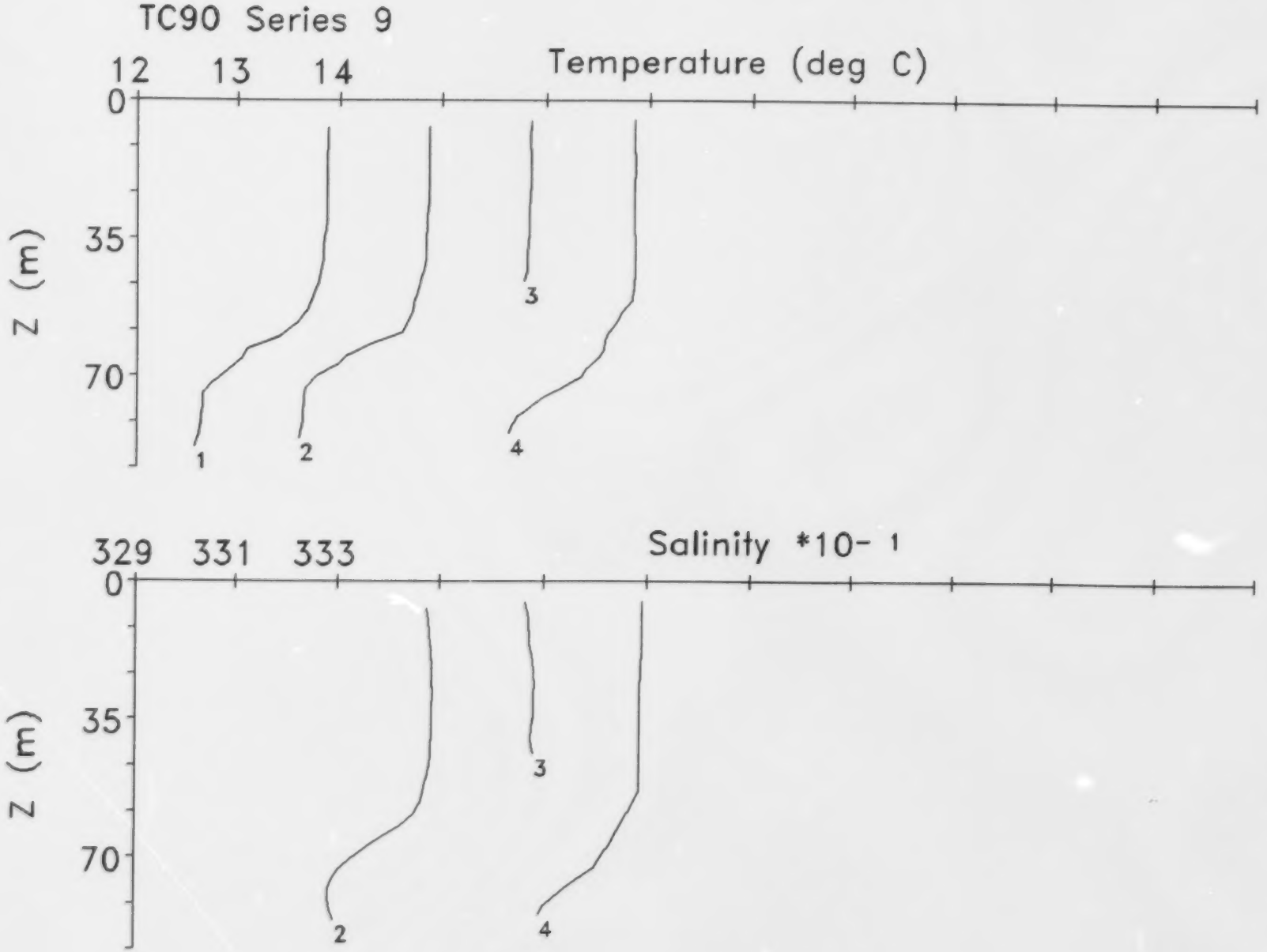
25
26
27
28
29
30
31
32

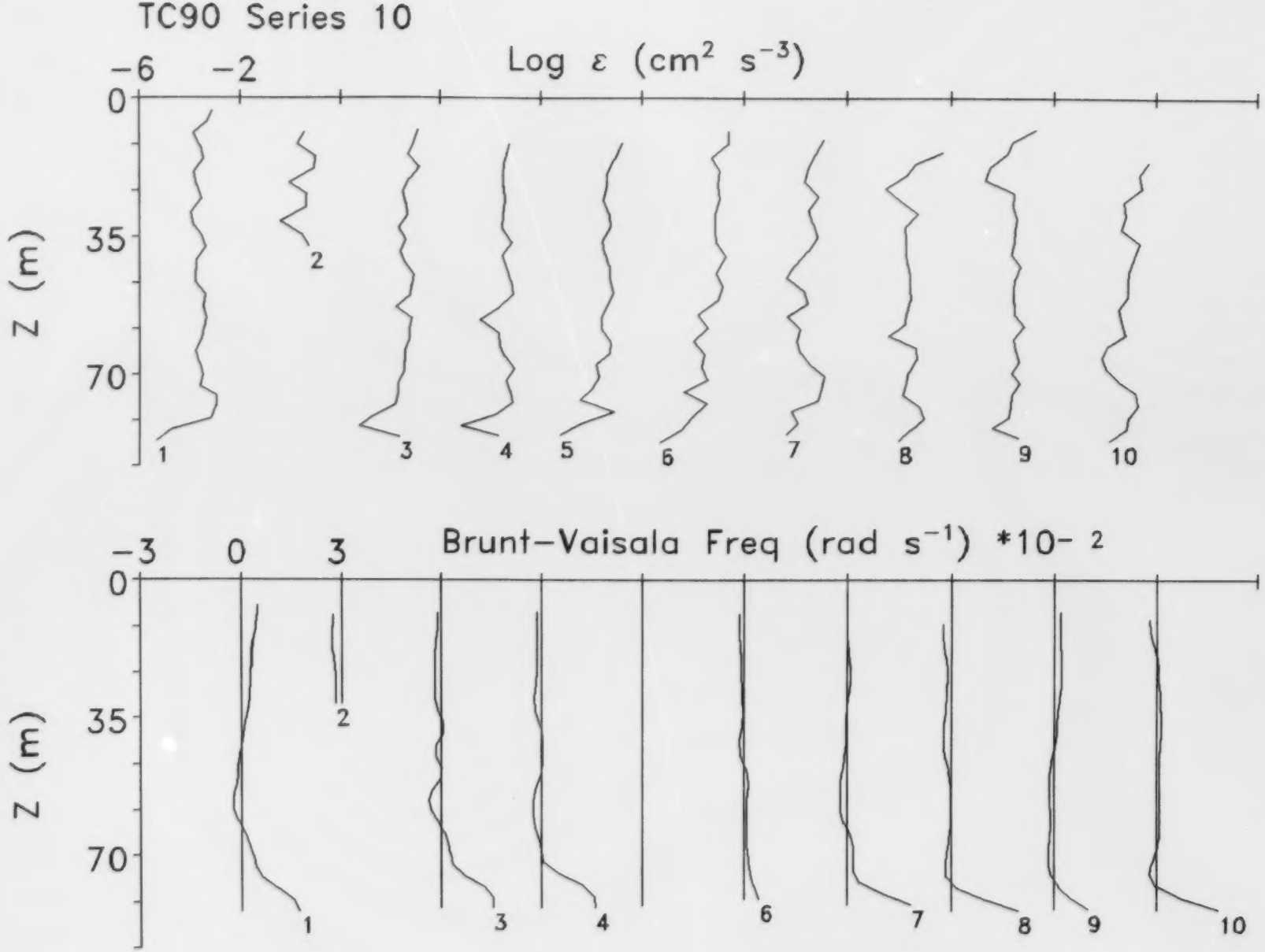

TC90 Series 8
12
13
14
Temperature (deg C)
0
35
70
Z (m)
23
24
25
26
27
28
29
30
31
32
329
331
333
Salinity *10- 1
0
35
70
Z (m)
23
24
25
26
27
28
29
30
31
32

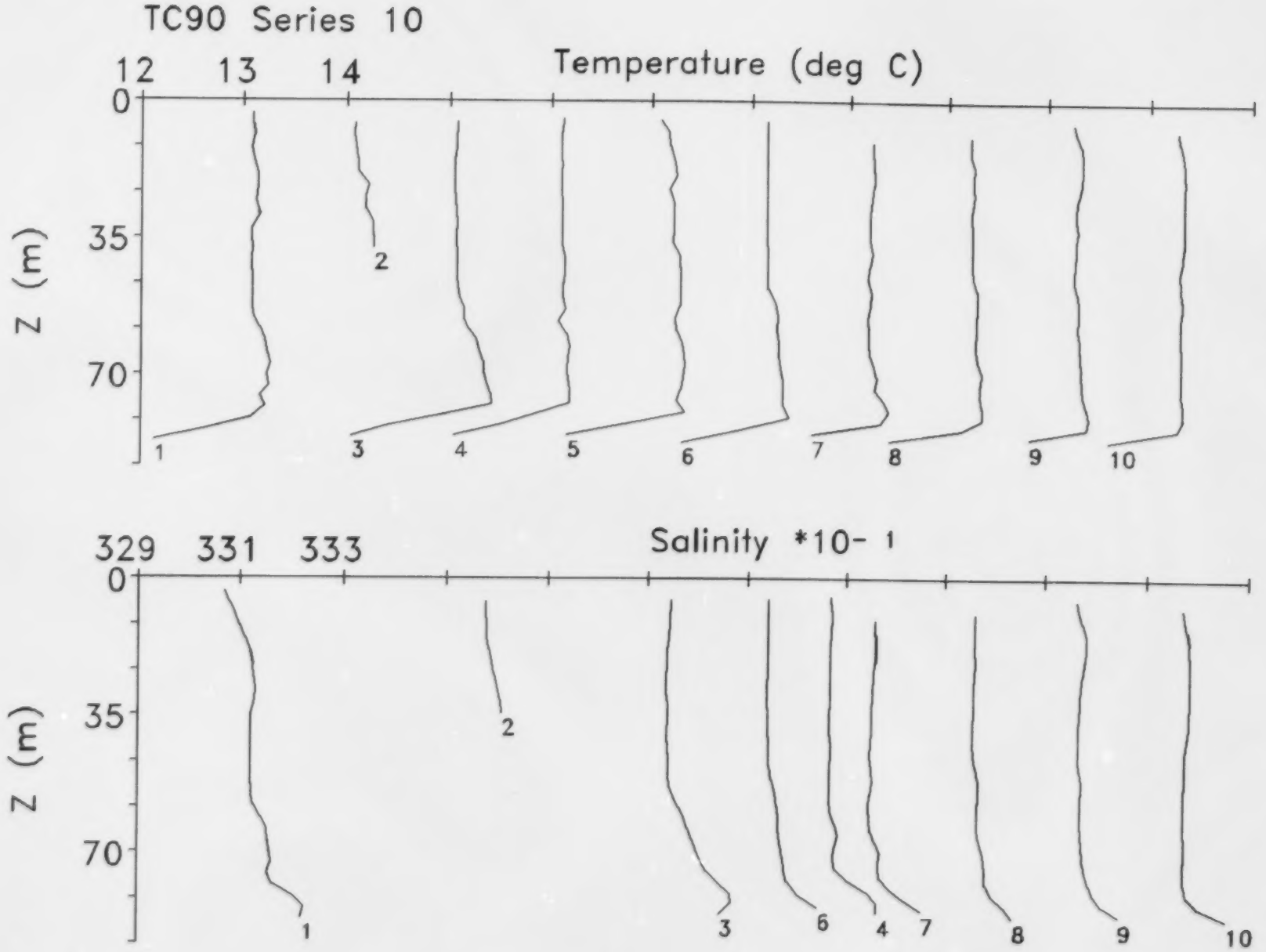

TC90 Series 8
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
33
34
35
37
38
39
40
41
42
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
35
70
Z (m)
33
34
35
37
38
39
40
41
42

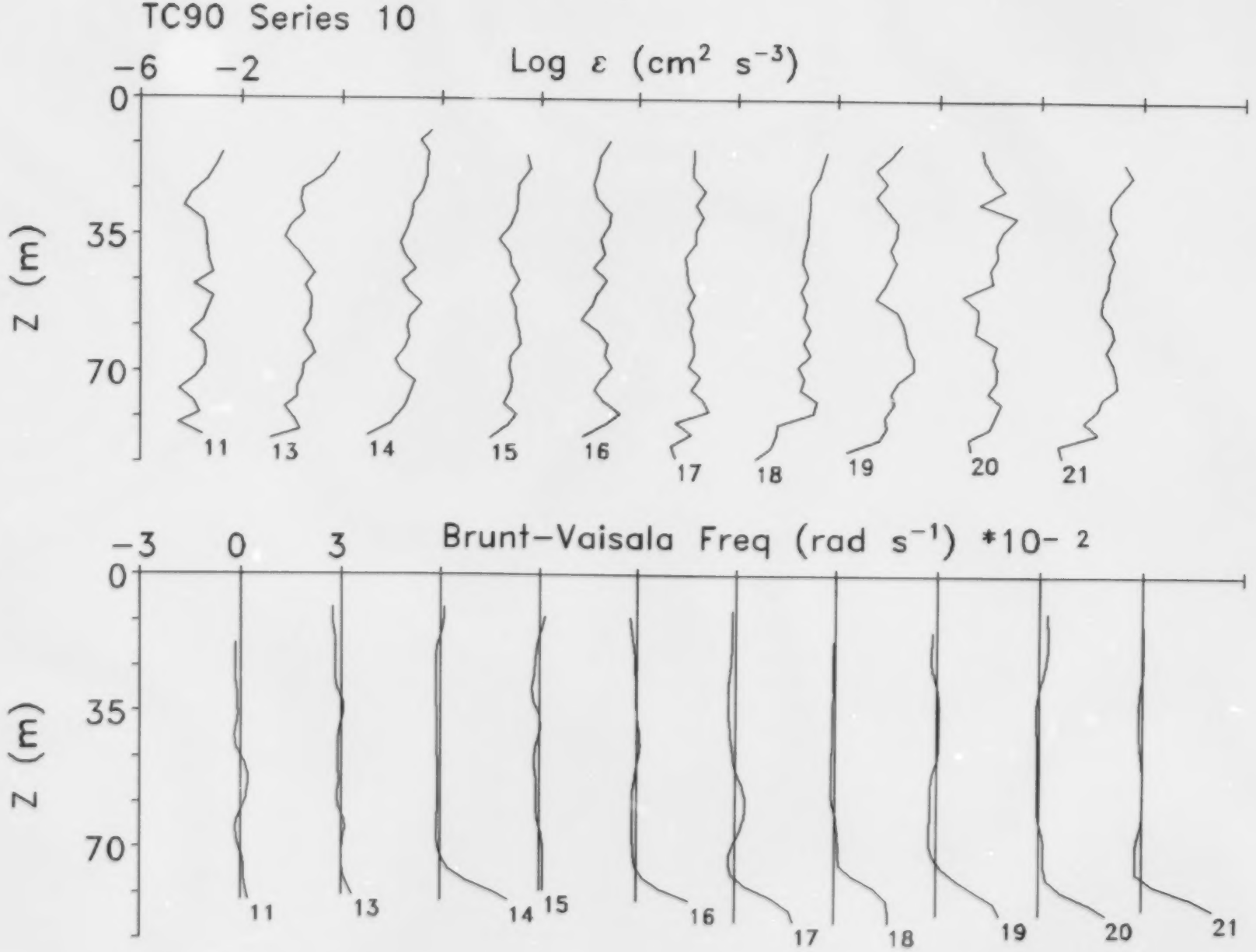

TC90 Series 8
12
13
14
Temperature (deg C)
0
35
70
Z (m)
33
34
35
37
38
39
40
41
42
329
331
333
Salinity *10- 1
0
35
70
Z (m)
33
34
35
37
38
39
40
41
42


TC90 Series 9
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
4
Brunt−Vaisala Freq (rad s⁻¹) *10- 2
−3
0
3
0
35
70
Z (m)
2
3
4


TC90 Series 9
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
4
329
331
333
Salinity *10- 1
0
35
70
Z (m)
2
3
4


TC90 Series 10
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
35
70
Z (m)
1
2
3
4
6
7
8
9
10


TC90 Series 10
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2
3
6
4
7
8
9
10


TC90 Series 10
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
11
13
14
15
16
17
18
19
20
21
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
11
13
14
15
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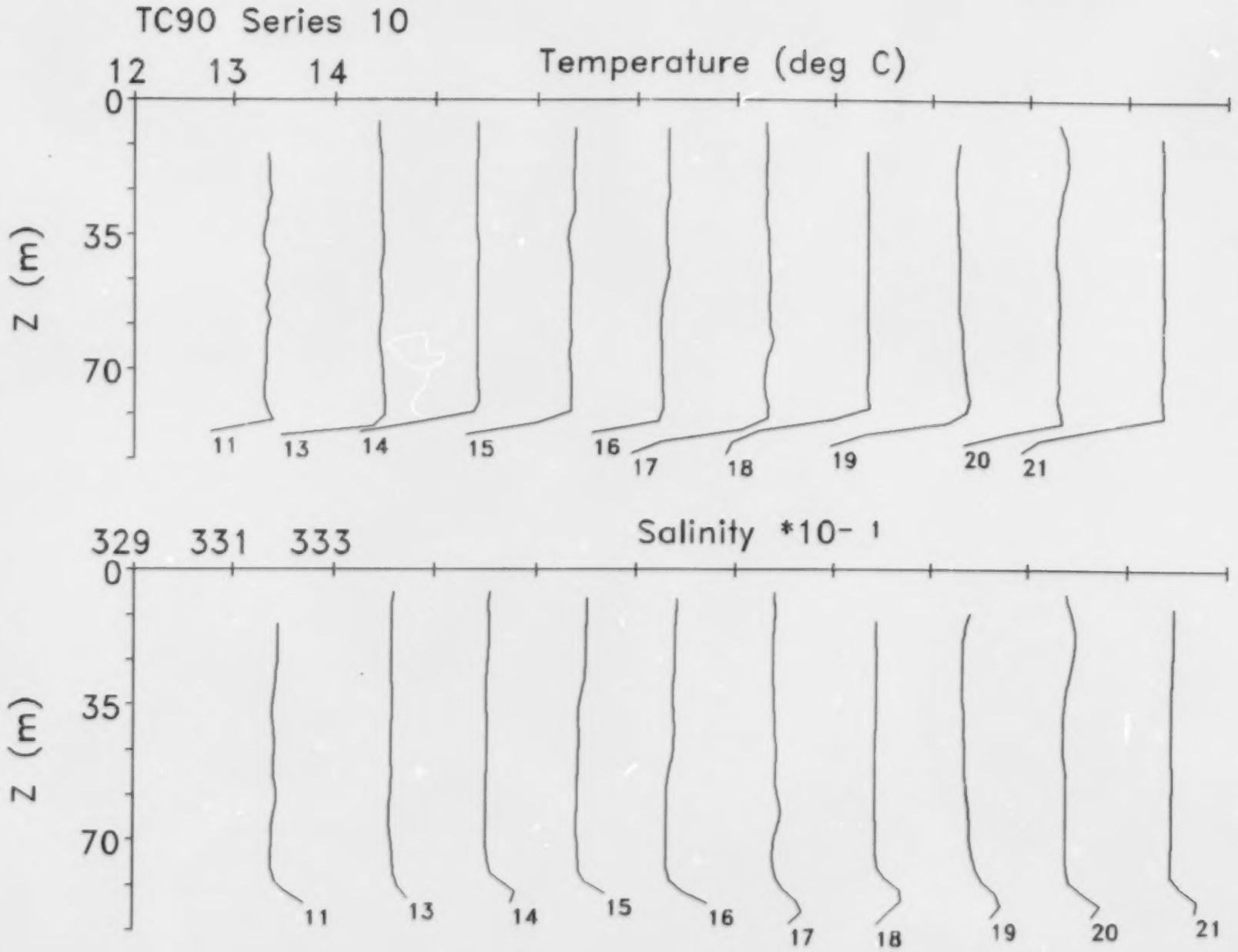
18
19
20
21


TC90 Series 10
Temperature (deg C)
12
13
14
0
35
70
Z (m)
11
13
14
15
16
17
18
19
20
21
Salinity *10- 1
329
331
333
0
35
70
Z (m)
11
13
14
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19
20
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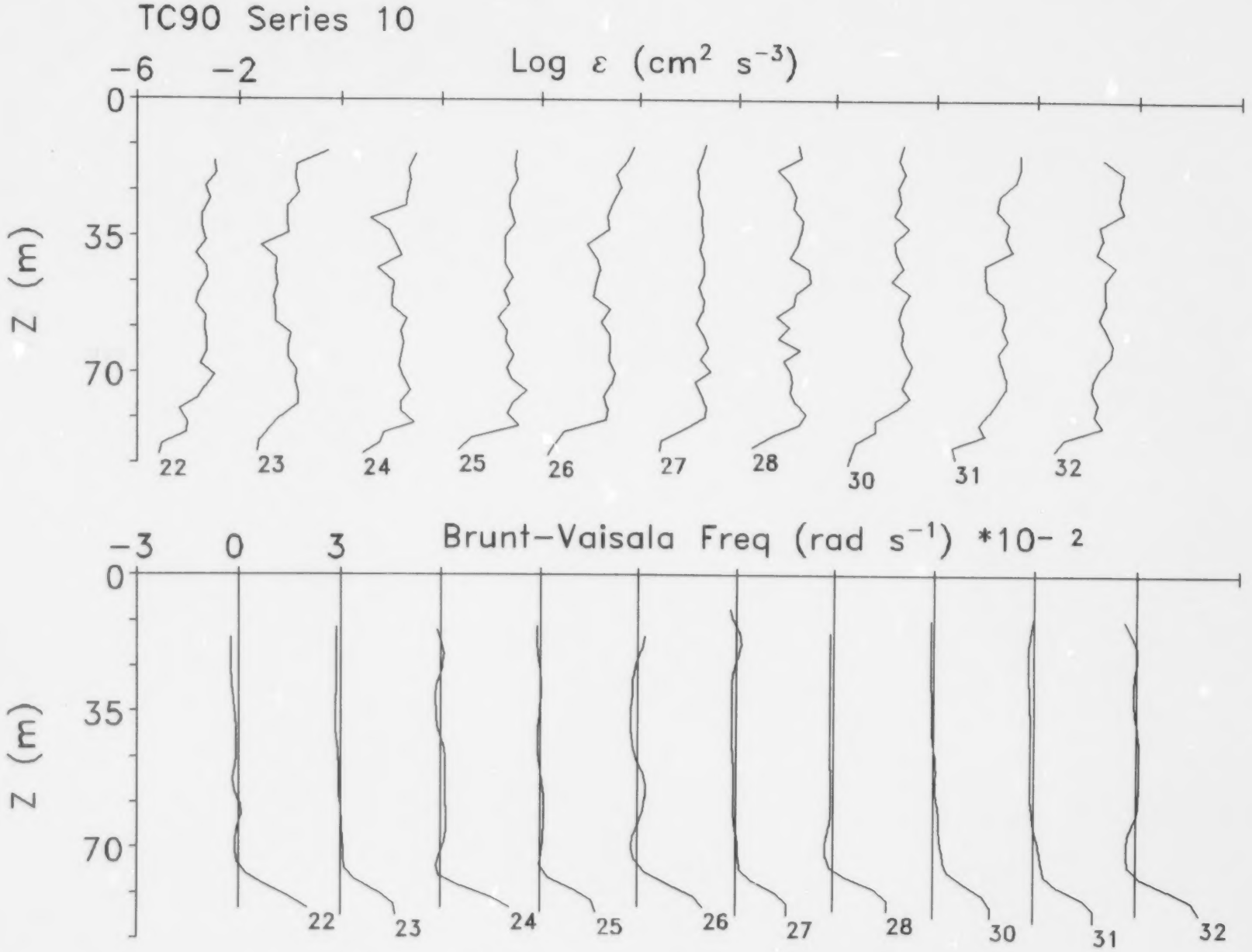
TC90 Series 10
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
22
23
24
25
26
27
28
30
31
32
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
22
23
24
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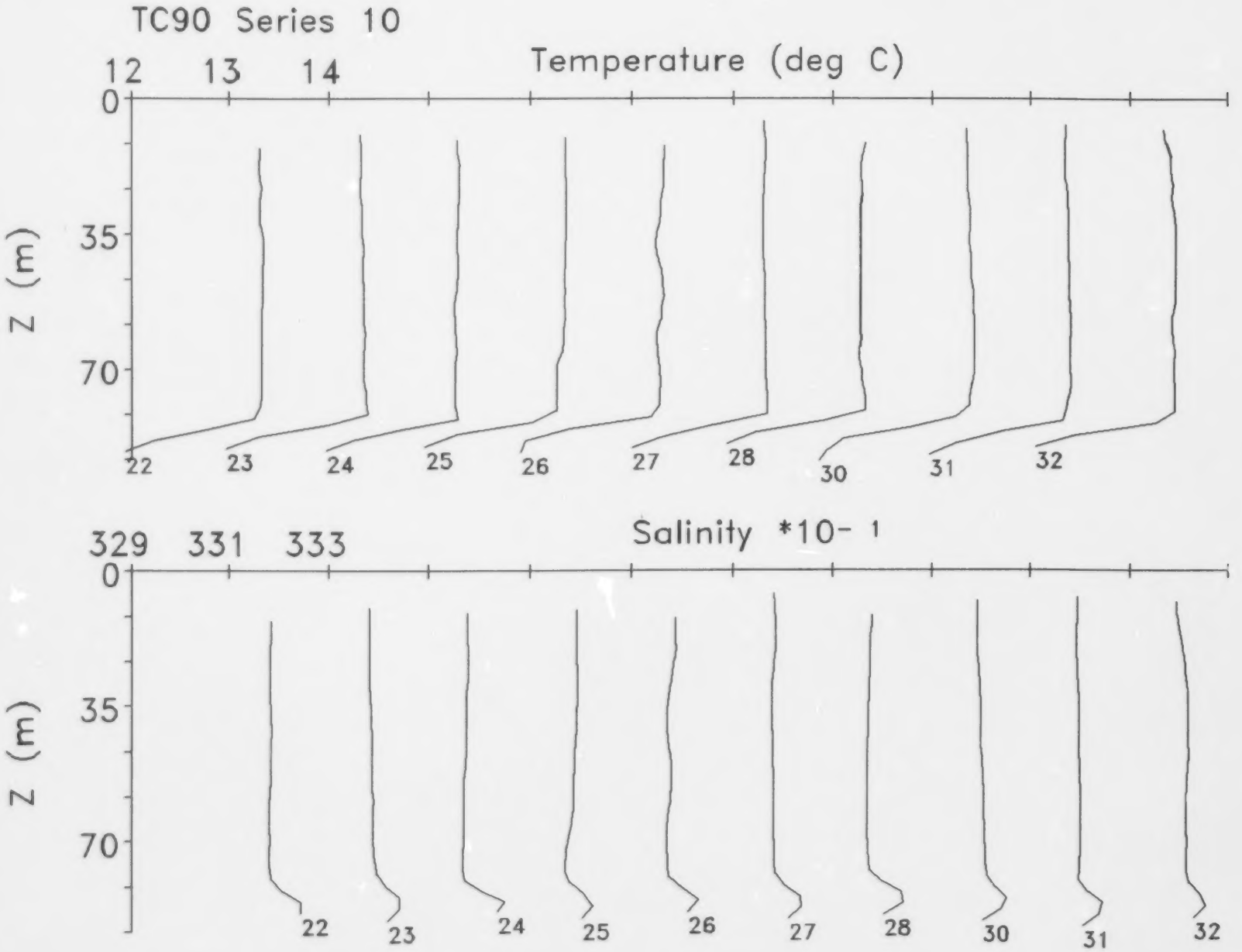
28
30
31
32


TC90 Series 10
Temperature (deg C)
12
13
14
0
35
70
Z (m)
22
23
24
25
26
27
28
30
31
32
Salinity *10- 1
329
331
333
0
35
70
Z (m)
22
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24
25
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28
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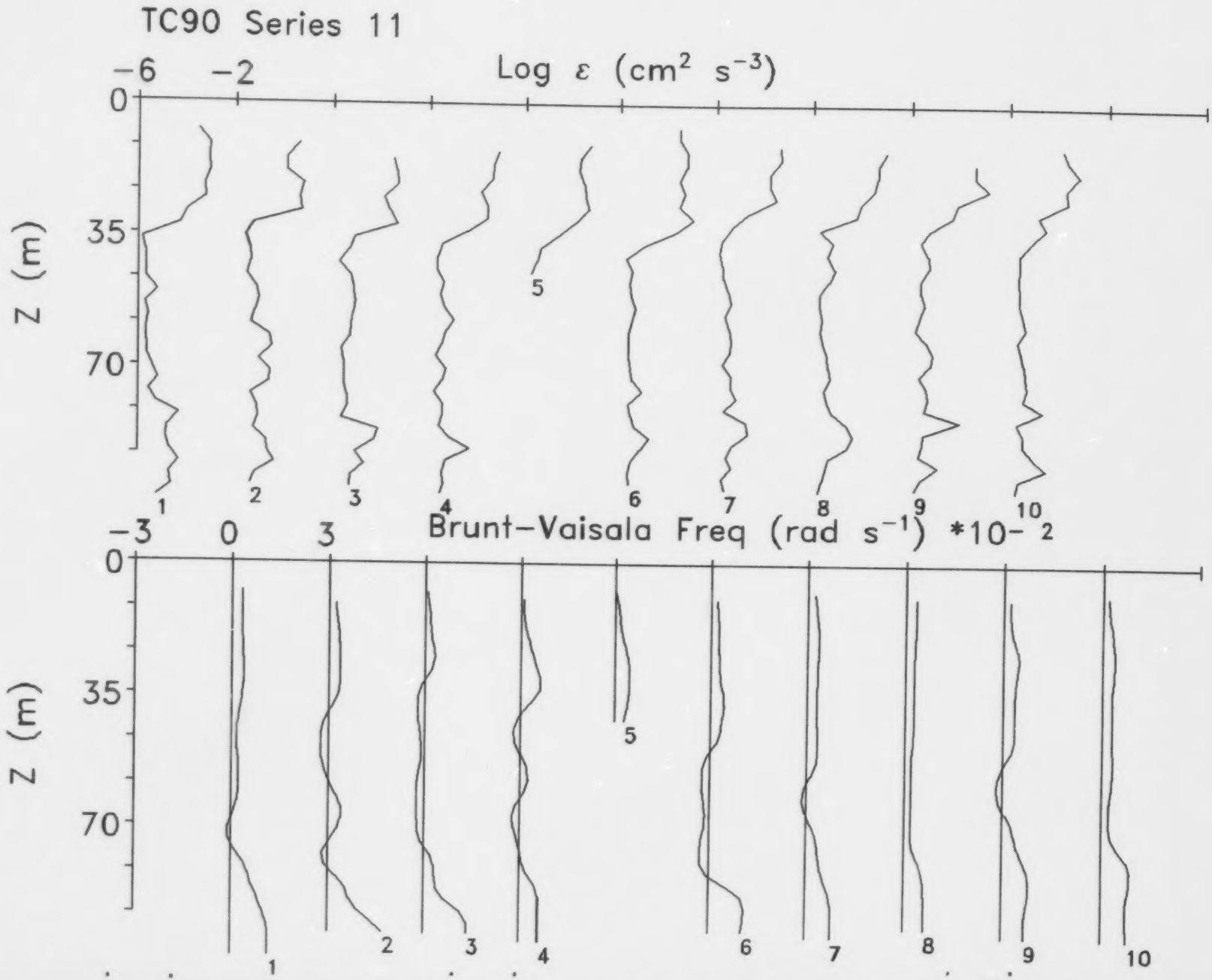
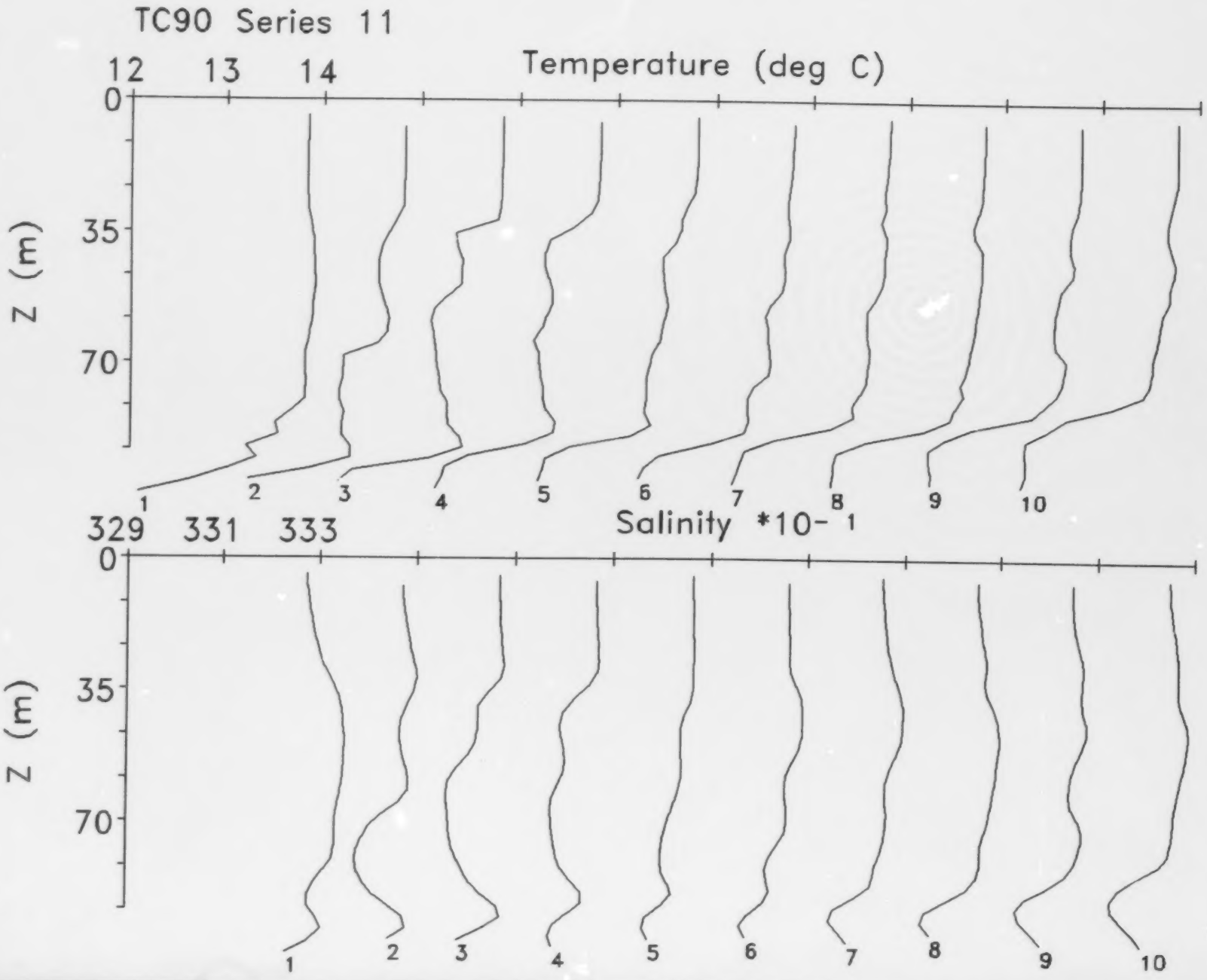
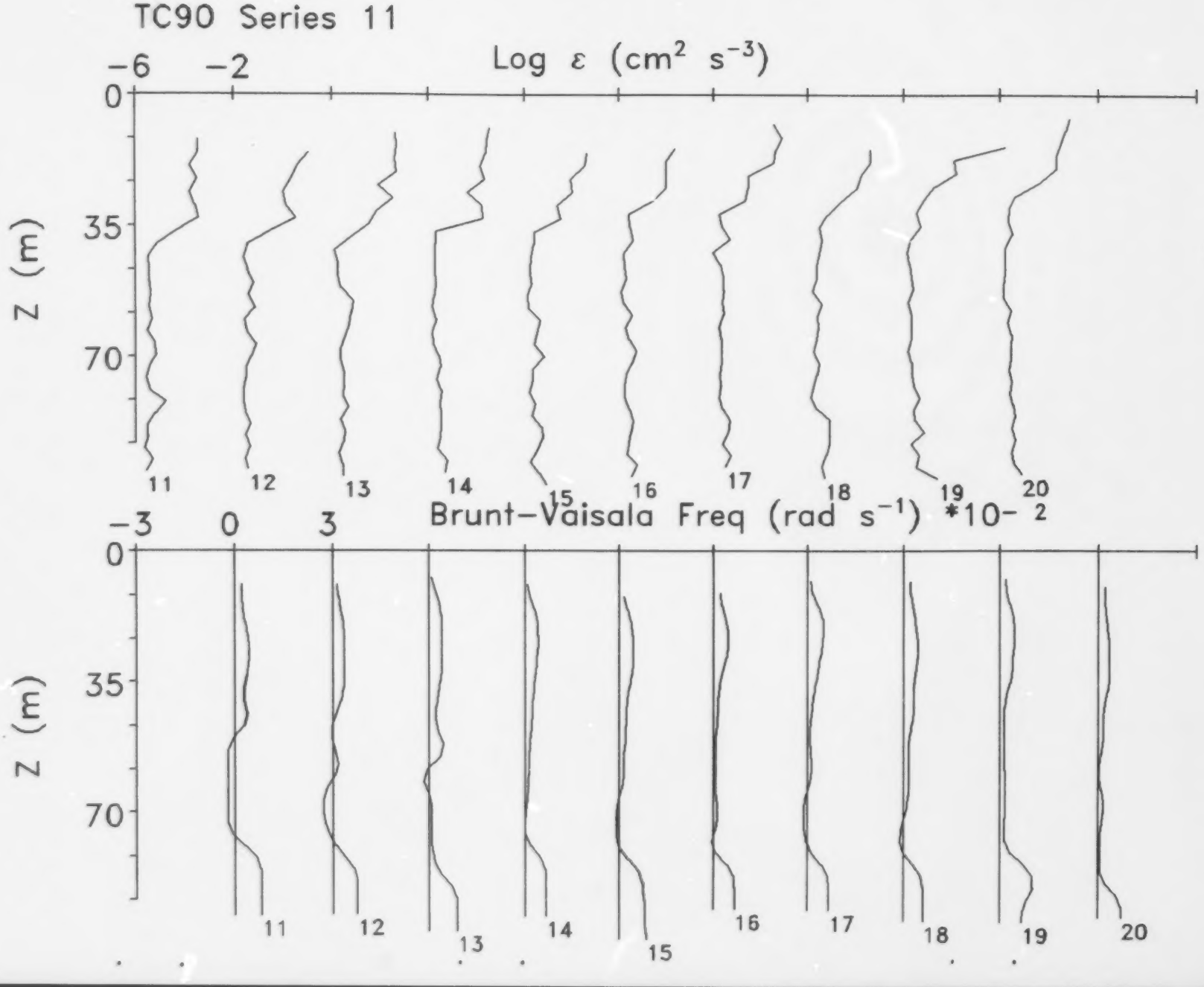
31
32


TC90 Series 11
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Brunt-Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10


TC90 Series 11
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
329
331
333
Salinity *10-1
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10


TC90 Series 11
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
11
12
13
14
15
16
17
18
19
20
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ 2
−3
0
3
0
35
70
Z (m)
11
12
13
14
15
16
17
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19
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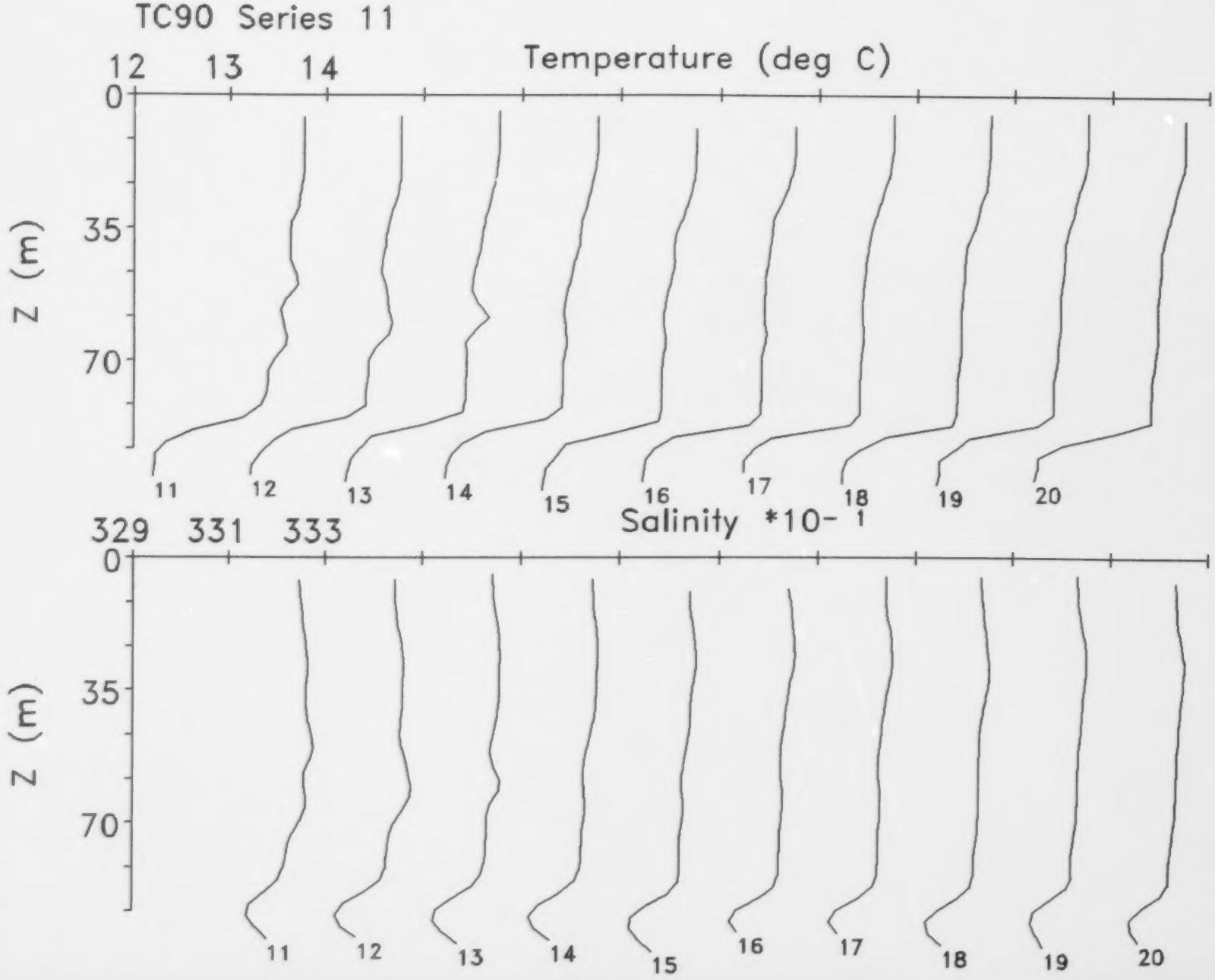
TC90 Series 11
12
13
14
Temperature (deg C)
0
35
70
Z (m)
11
12
13
14
15
16
17
18
19
20
329
331
333
Salinity *10- 1
0
35
70
Z (m)
11
12
13
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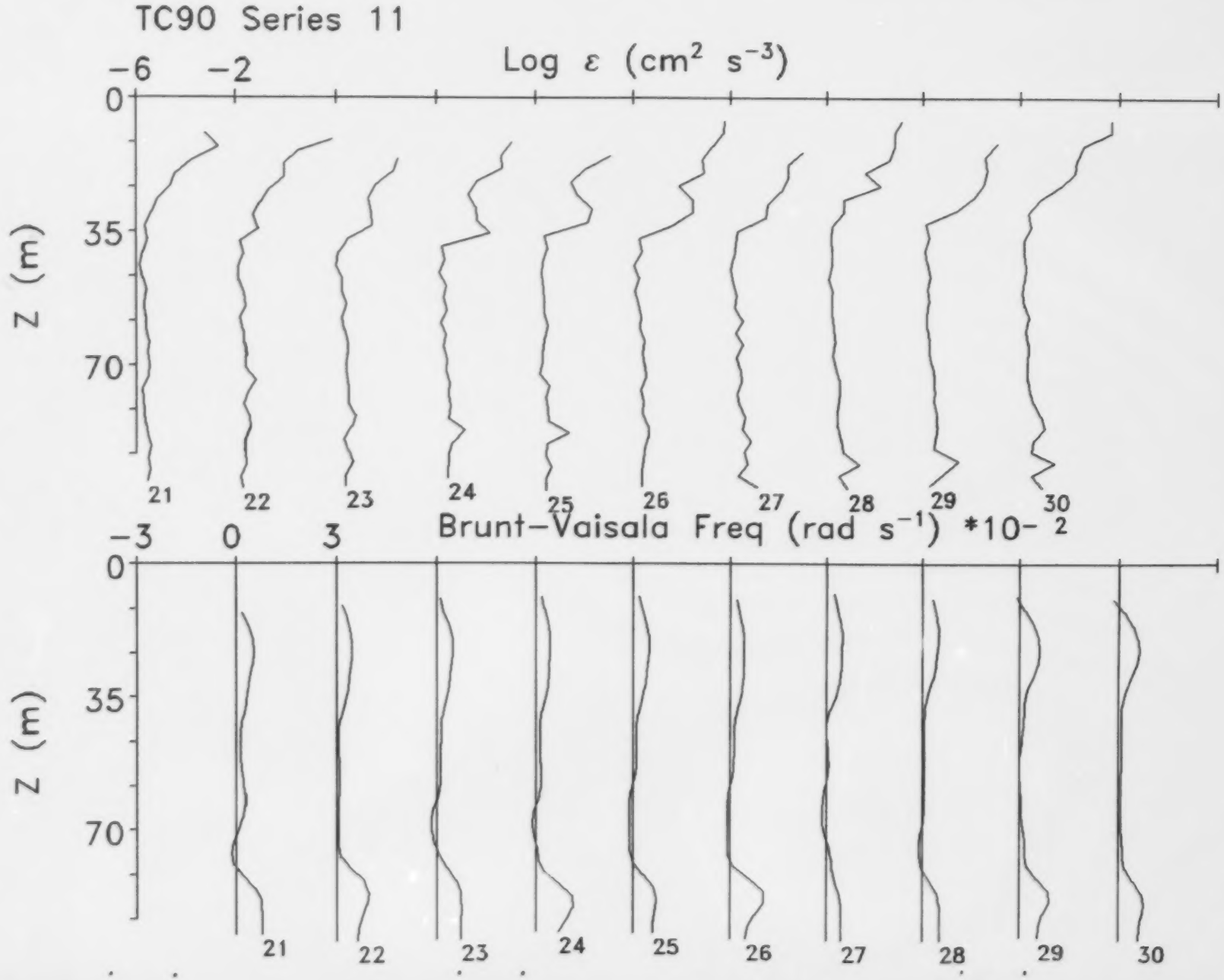
TC90 Series 11
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
21
22
23
24
25
26
27
28
29
30
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
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3
0
35
70
Z (m)
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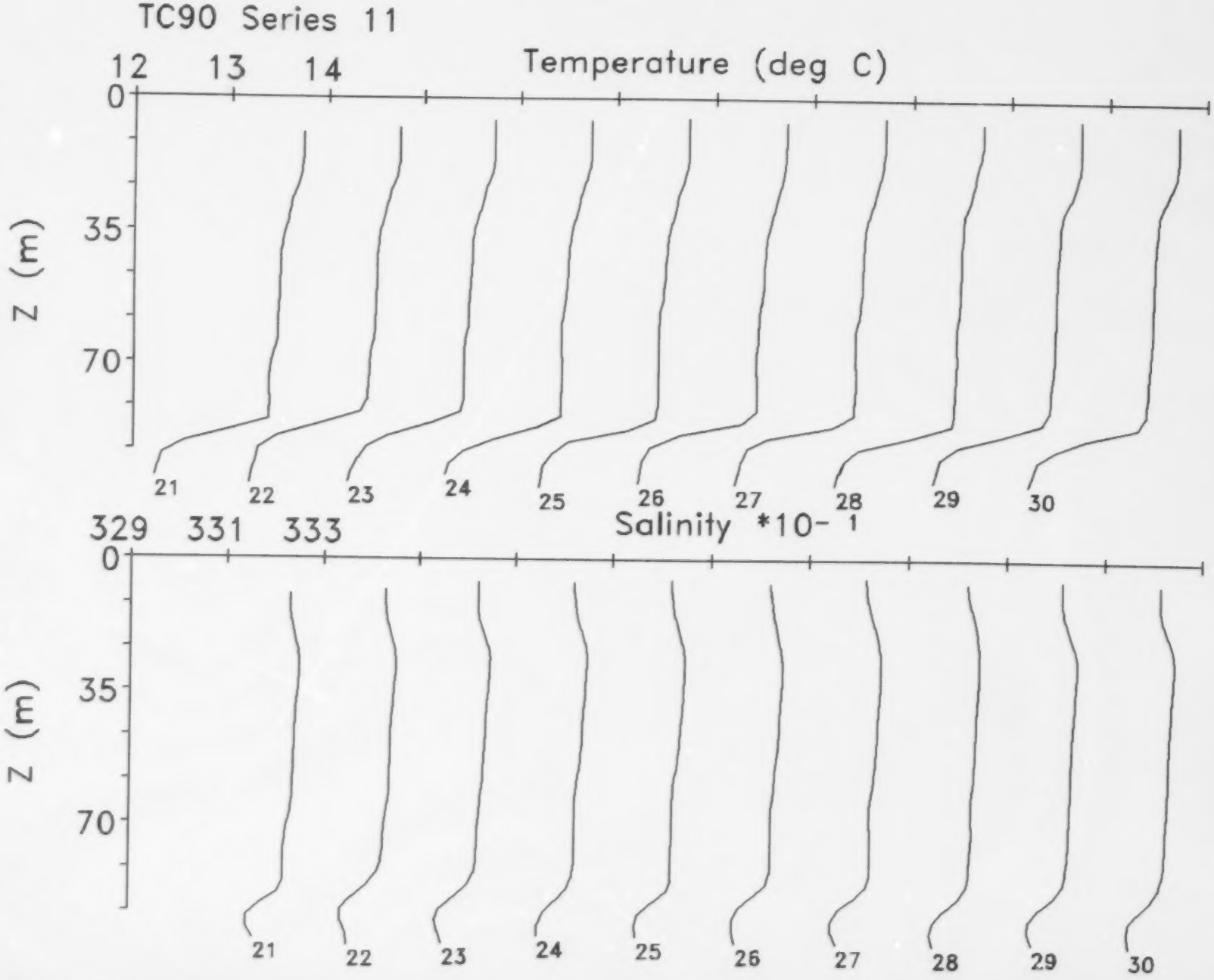
TC90 Series 11
12
13
14
Temperature (deg C)
0
35
70
Z (m)
21
22
23
24
25
26
27
28
29
30
329
331
333
Salinity *10- 1
0
35
70
Z (m)
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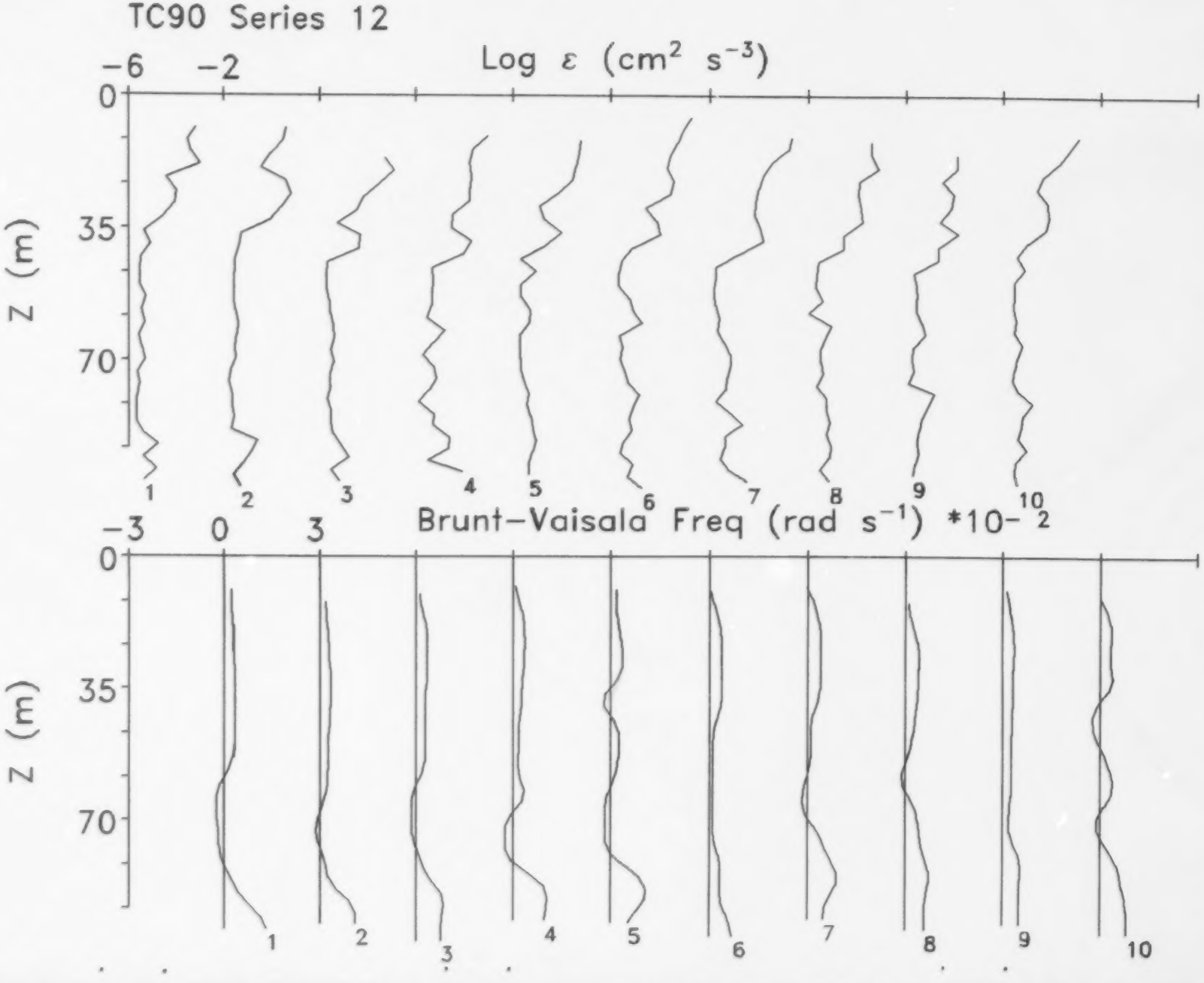
TC90 Series 12
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
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3
0
35
70
Z (m)
1
2
3
4
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6
7
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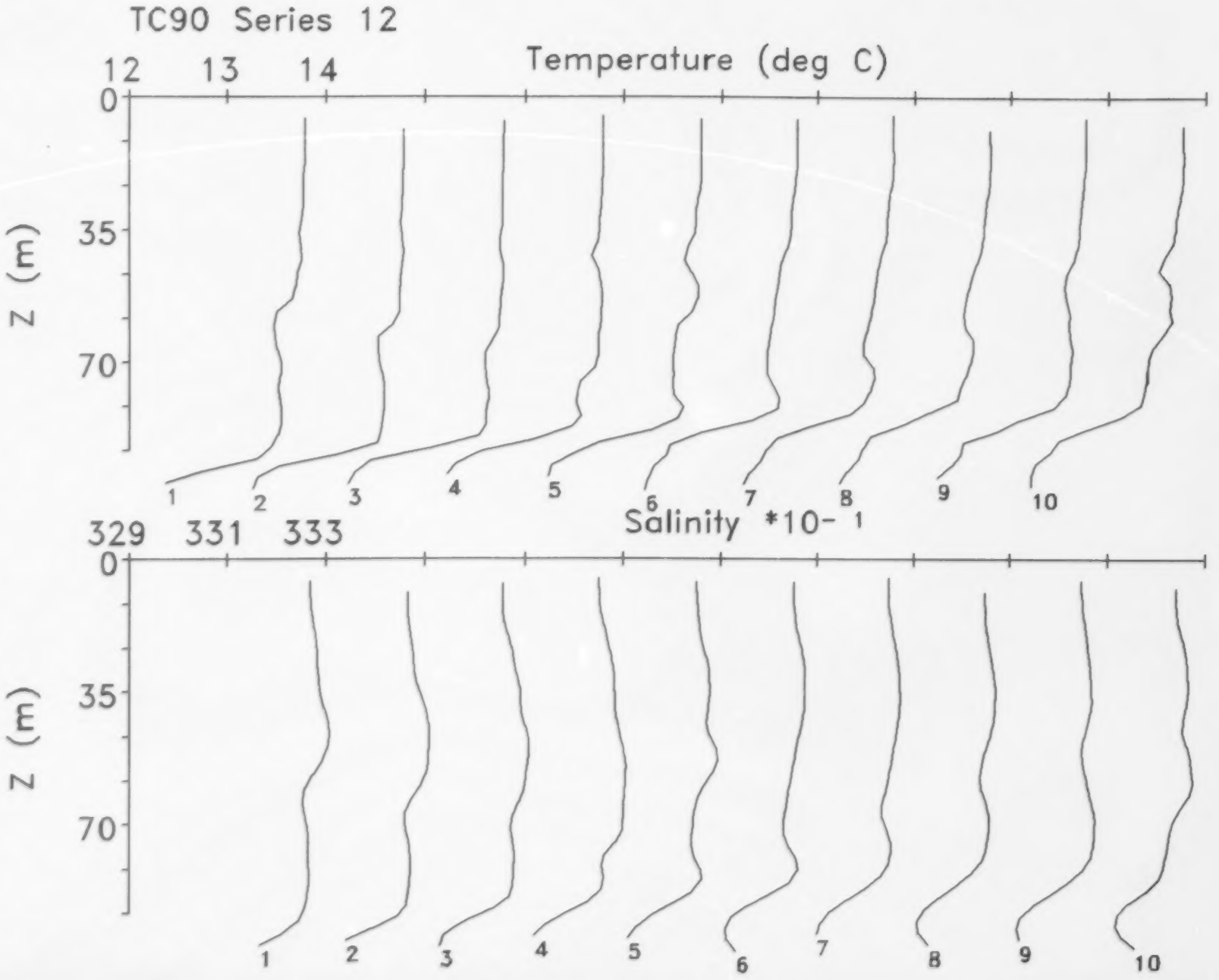
9
10


TC90 Series 12
Temperature (deg C)
12
13
14
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Salinity *10-1
329
331
333
0
35
70
Z (m)
1
2
3
4
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7
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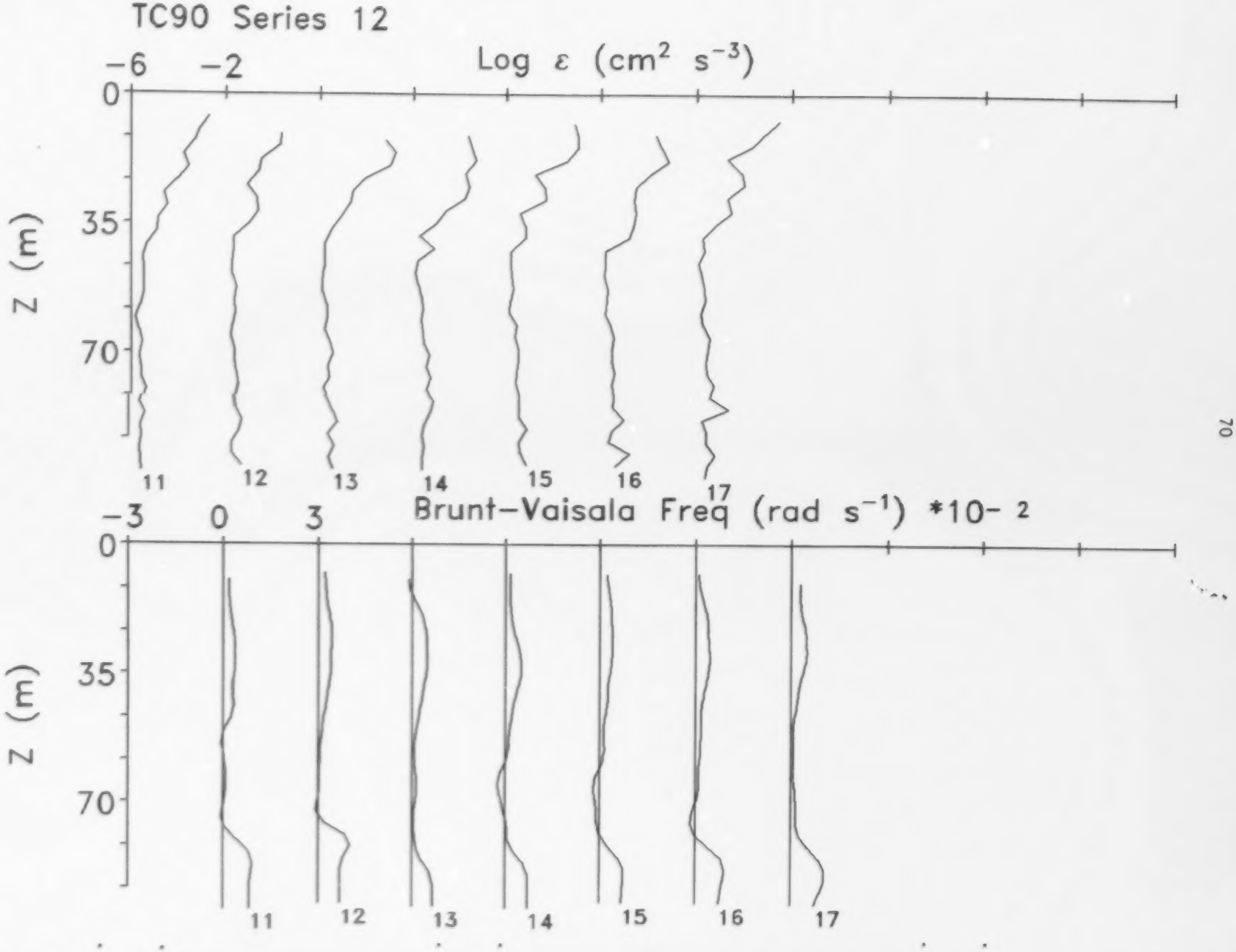
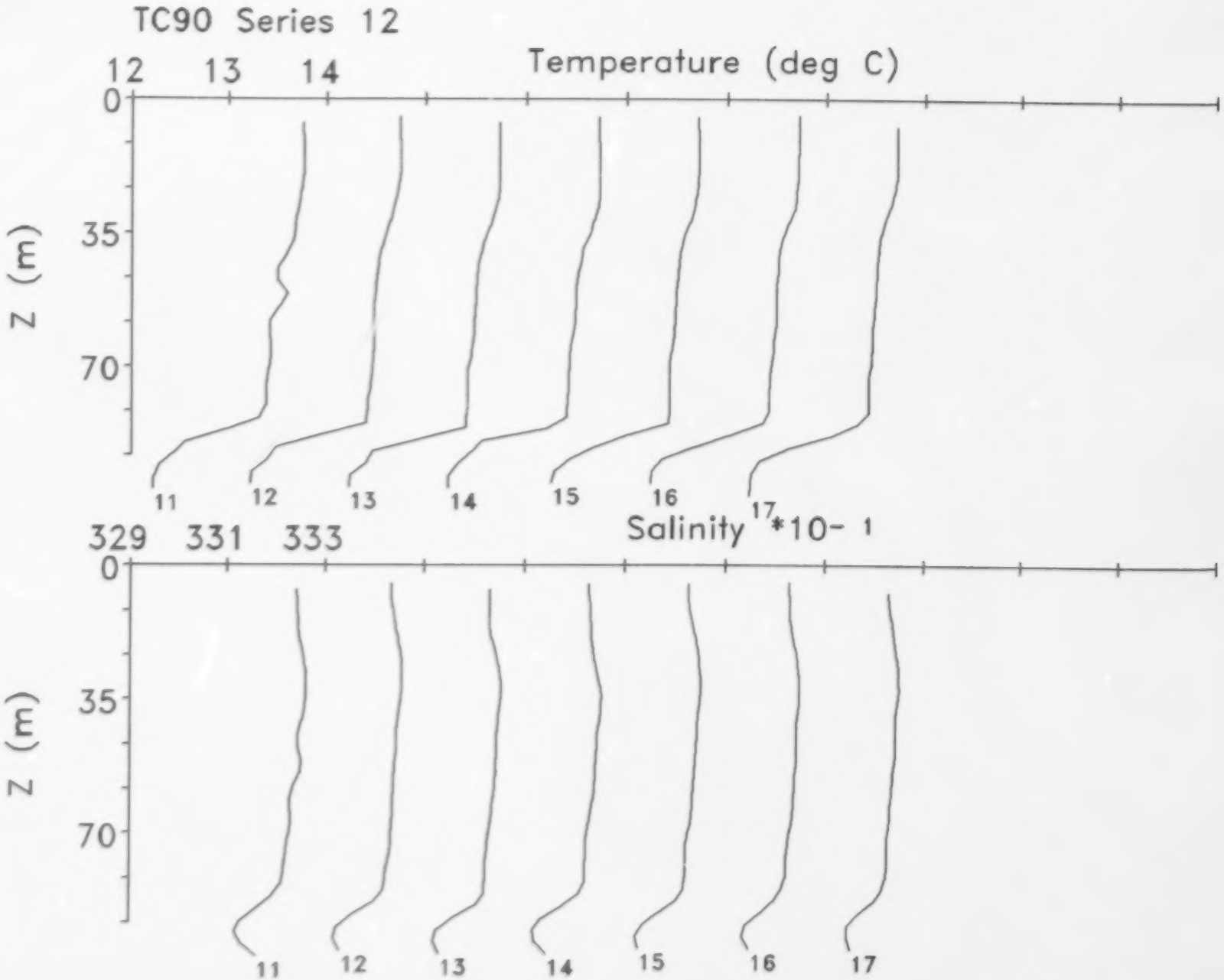
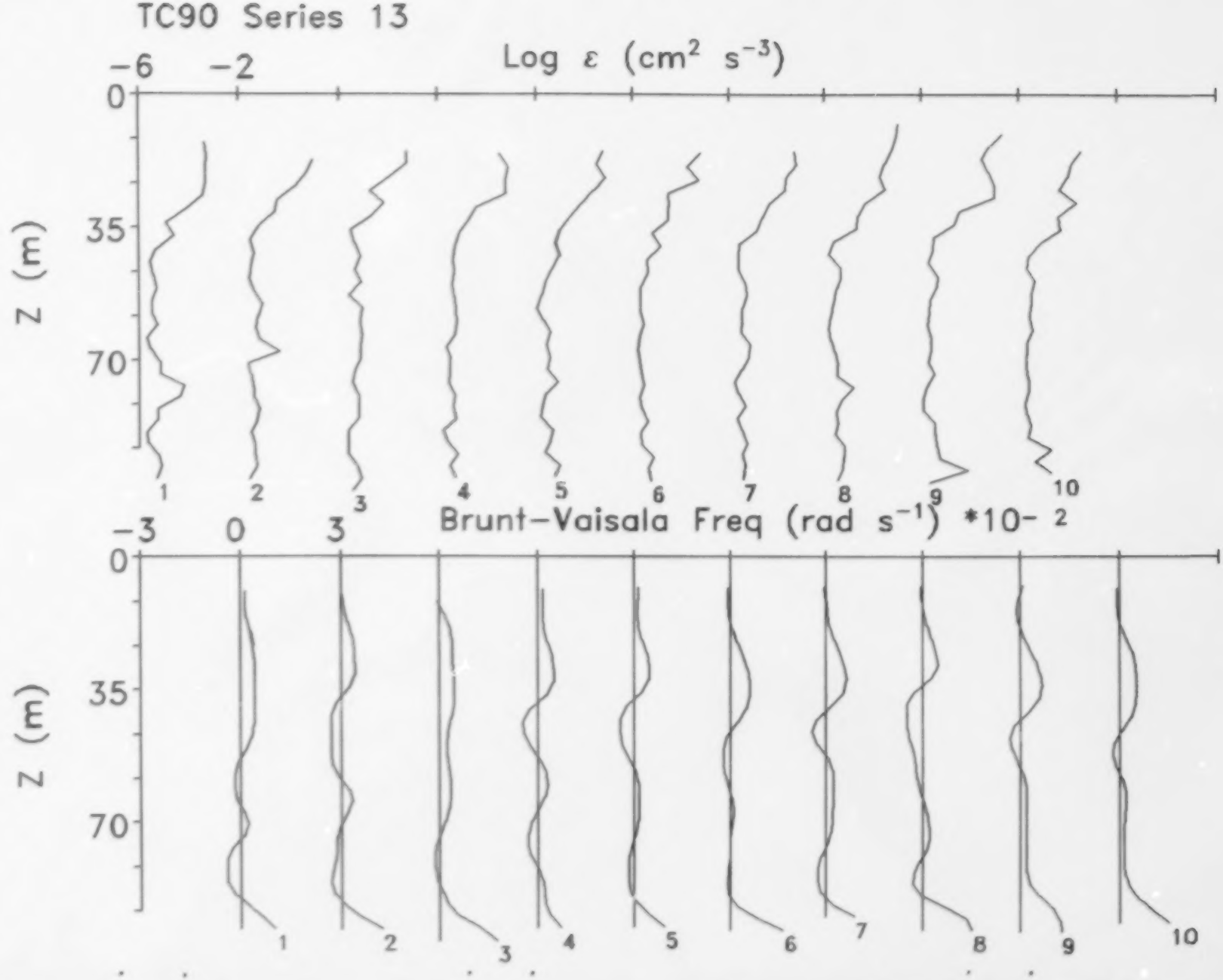
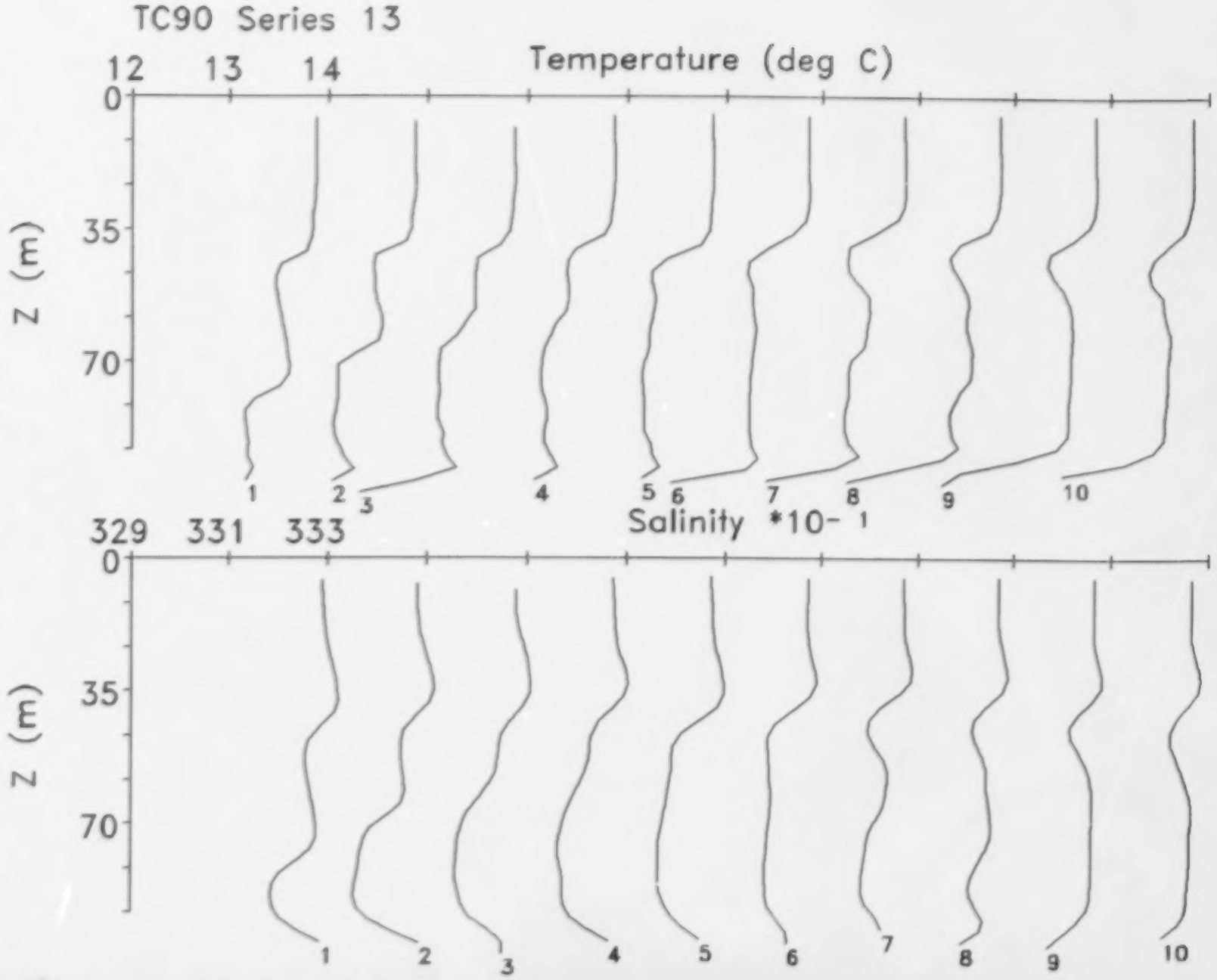
9
10


TC90 Series 12
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
11
12
13
14
15
16
17
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
11
12
13
14
15
16
17


TC90 Series 12
Temperature (deg C)
12
13
14
0
35
70
Z (m)
11
12
13
14
15
16
17
Salinity *10- 1
329
331
333
0
35
70
Z (m)
11
12
13
14
15
16
17


TC90 Series 13
Log ε (cm² s⁻³)
−6
−2
0
35
70
z (m)
1
2
3
4
5
6
7
8
9
10
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
35
70
z (m)
1
2
3
4
5
6
7
8
9
10


TC90 Series 13
Temperature (deg C)
12
13
14
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Salinity *10- 1
329
331
333
0
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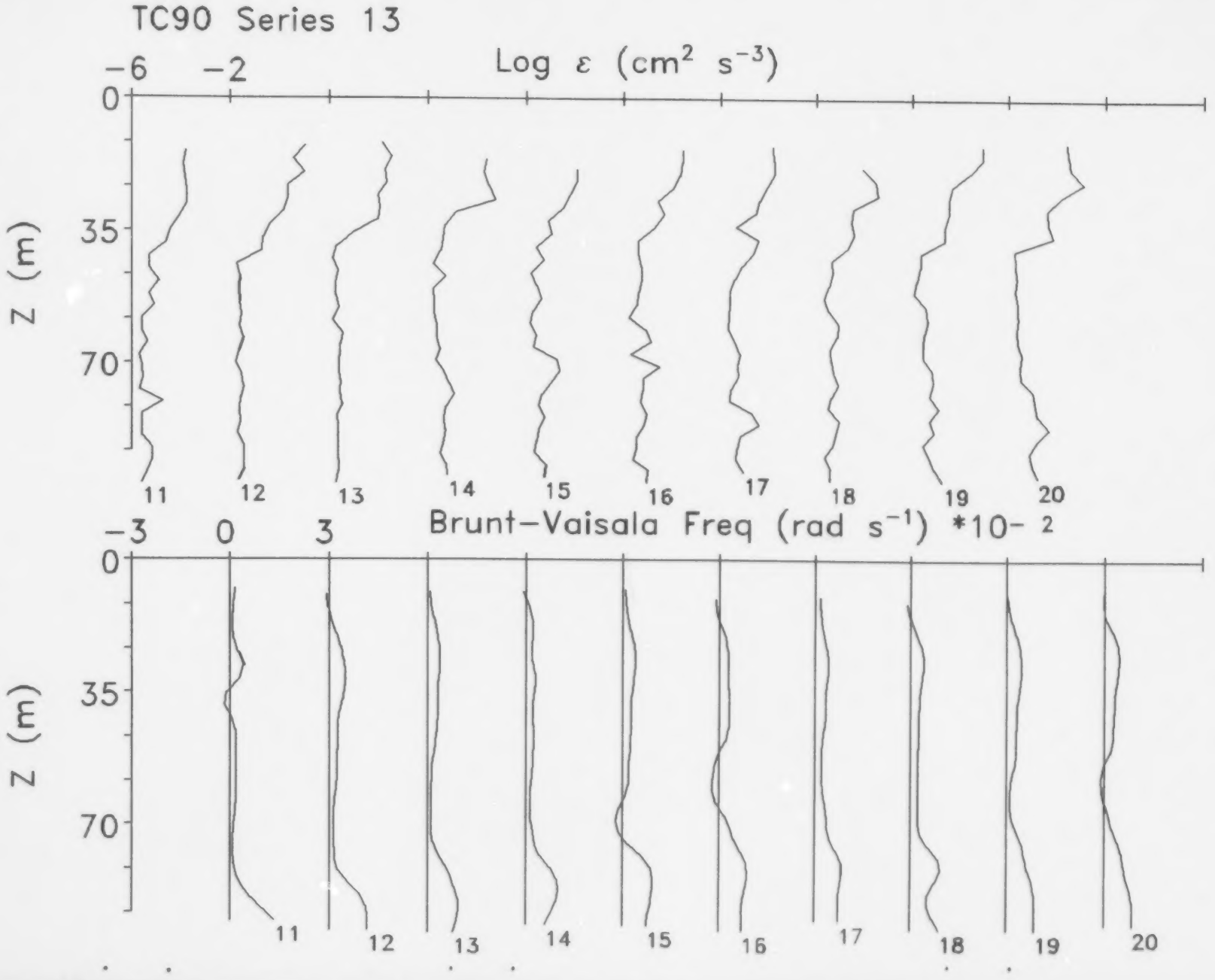
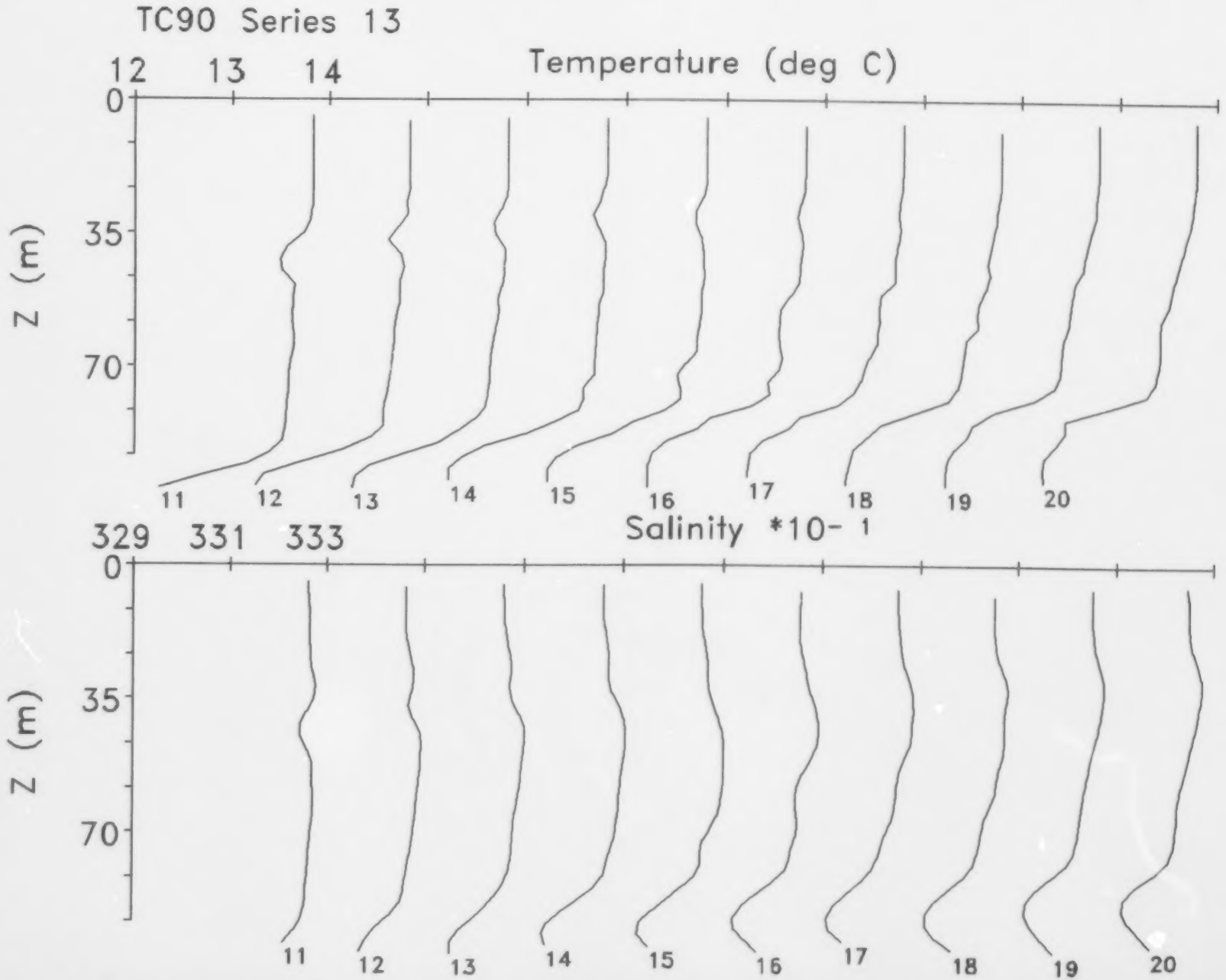
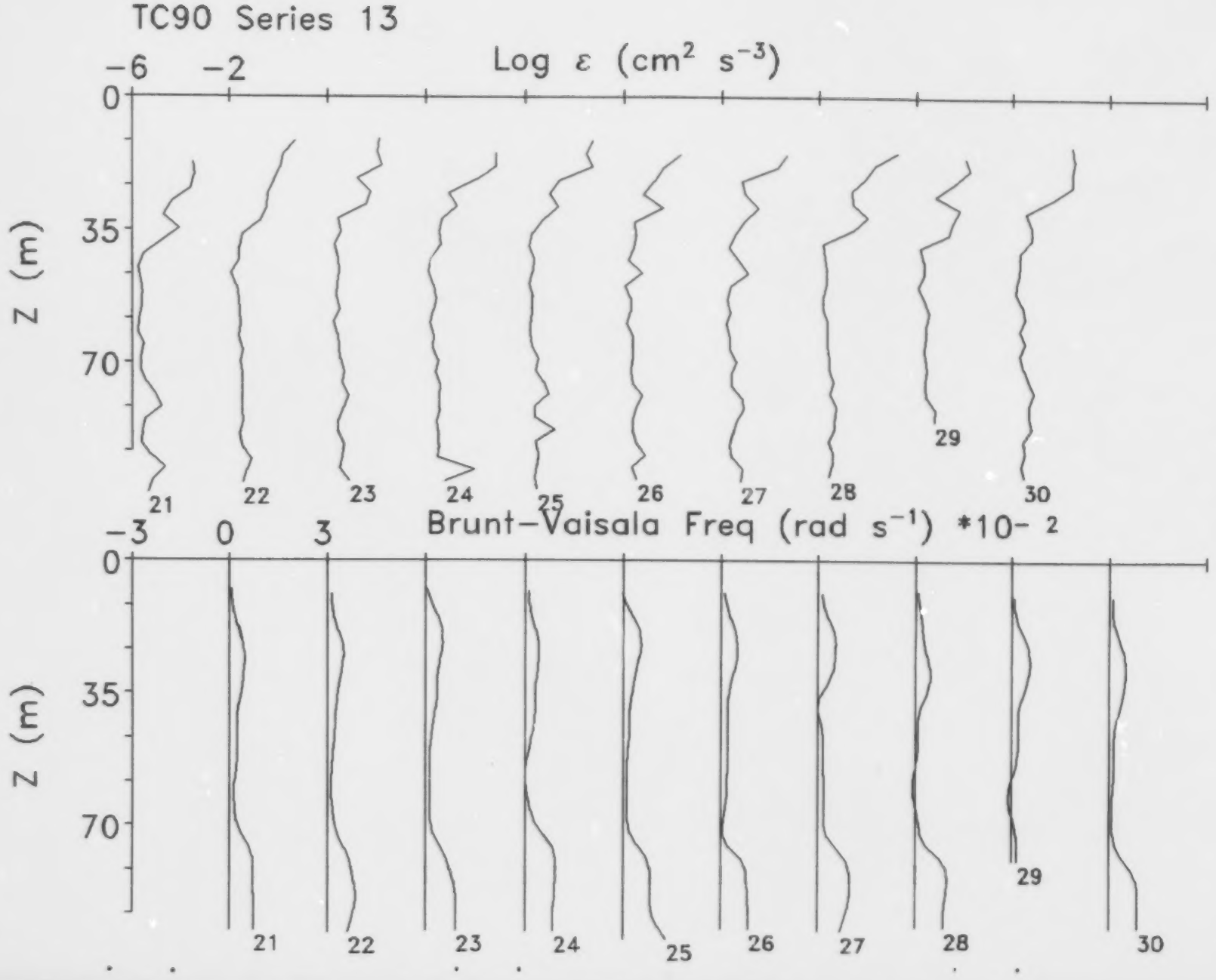
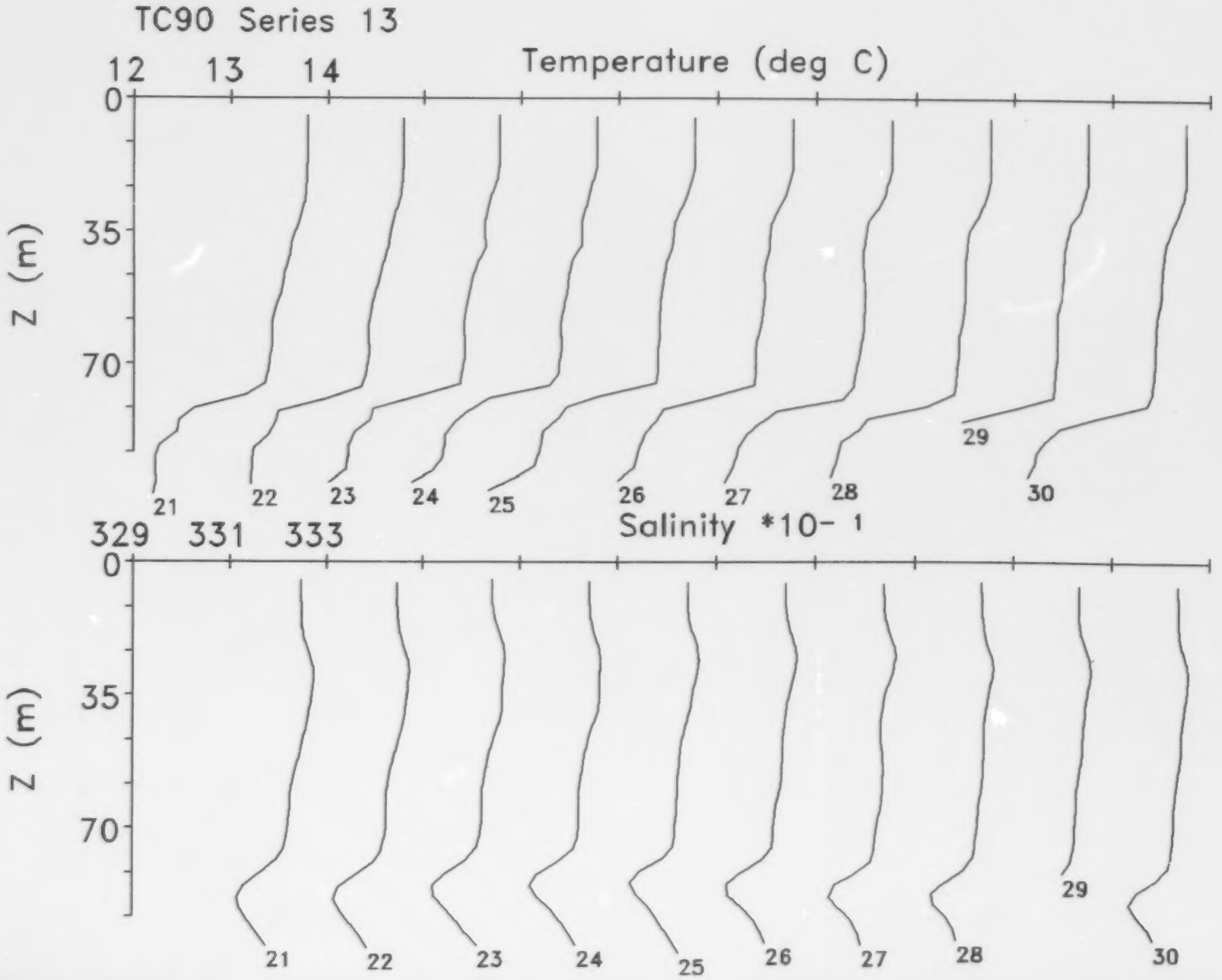
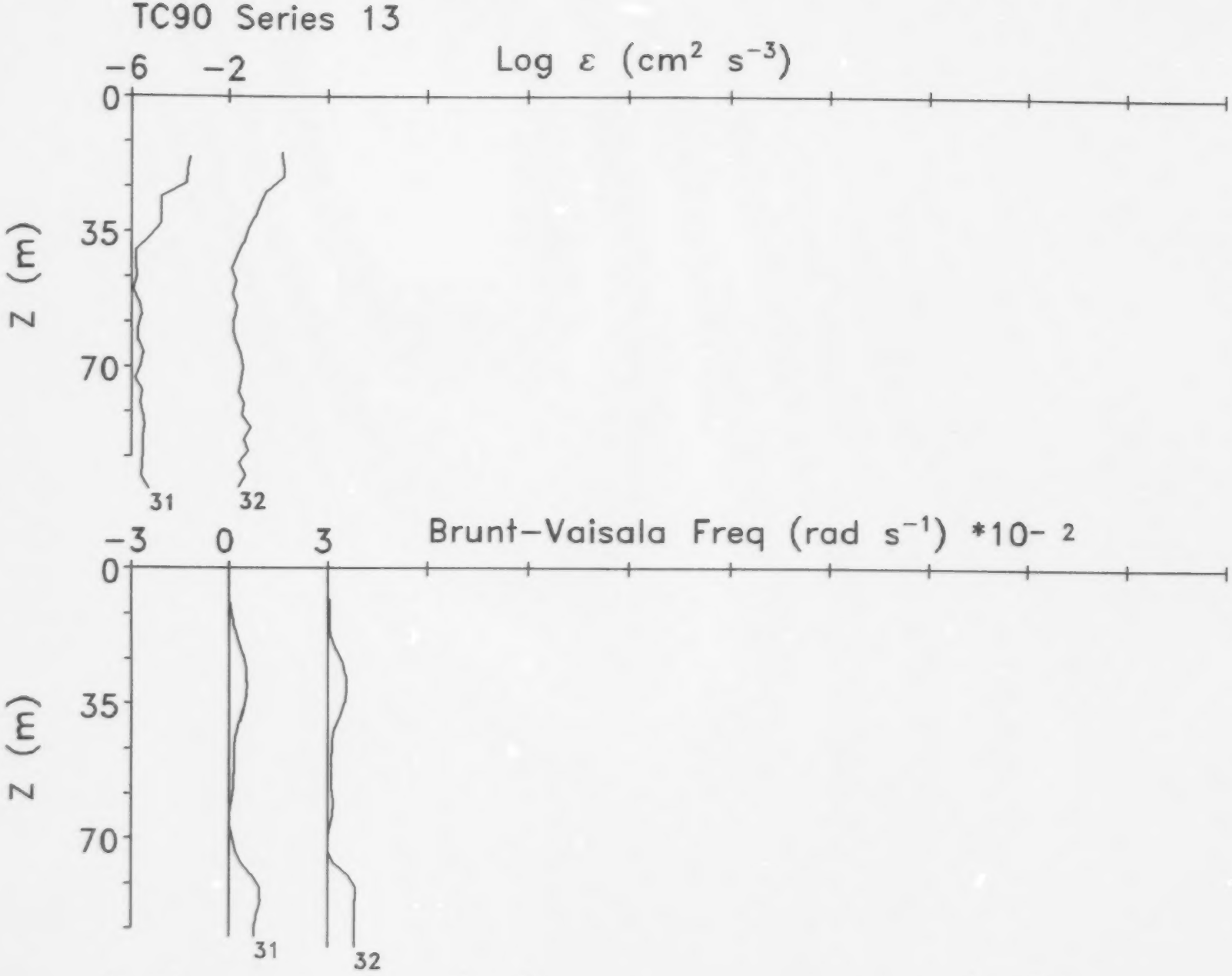
70
Z (m)
1
2
3
4
5
6
7
8
9
10

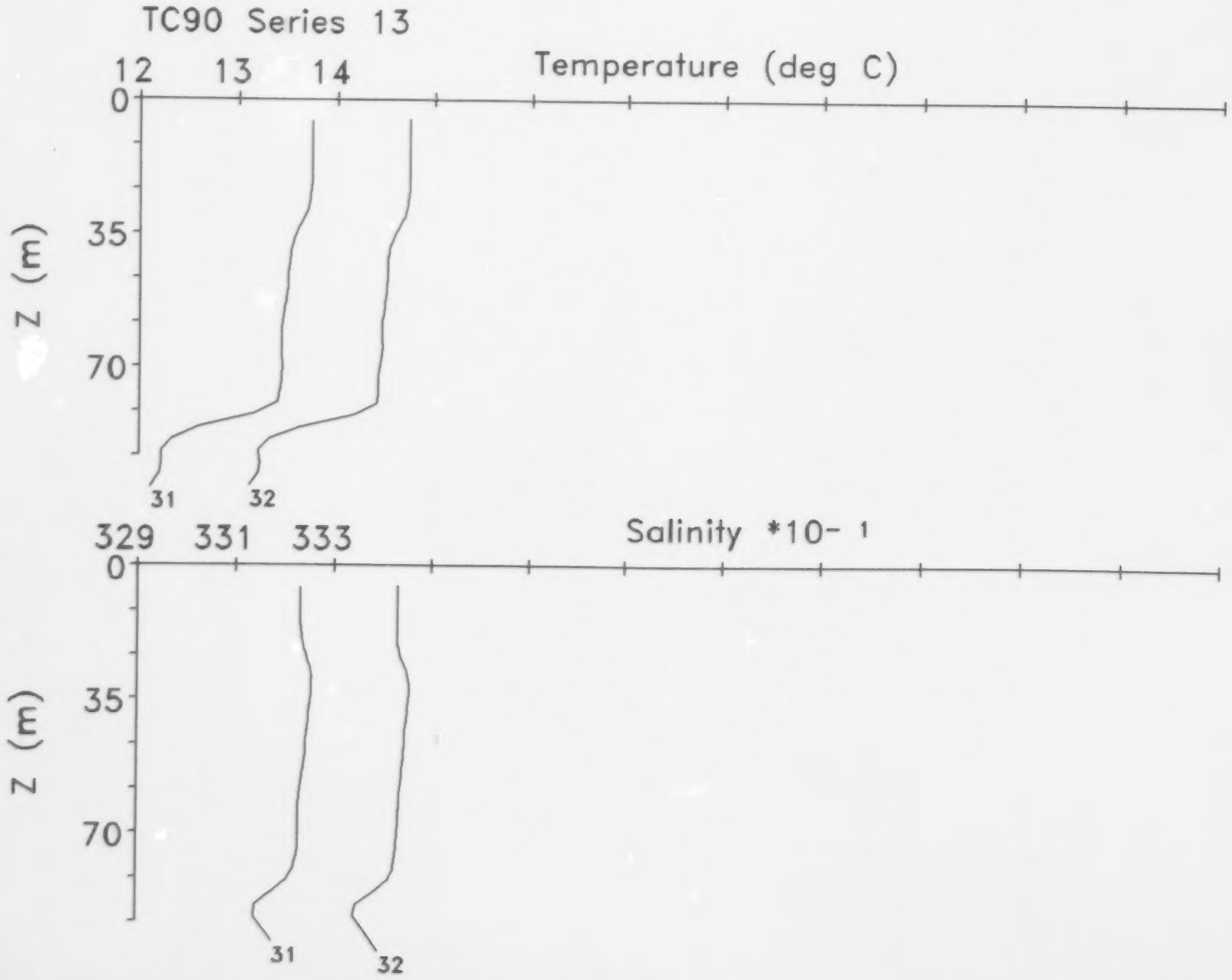

TC90 Series 13
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
11
12
13
14
15
16
17
18
19
20
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
11
12
13
14
15
16
17
18
19
20

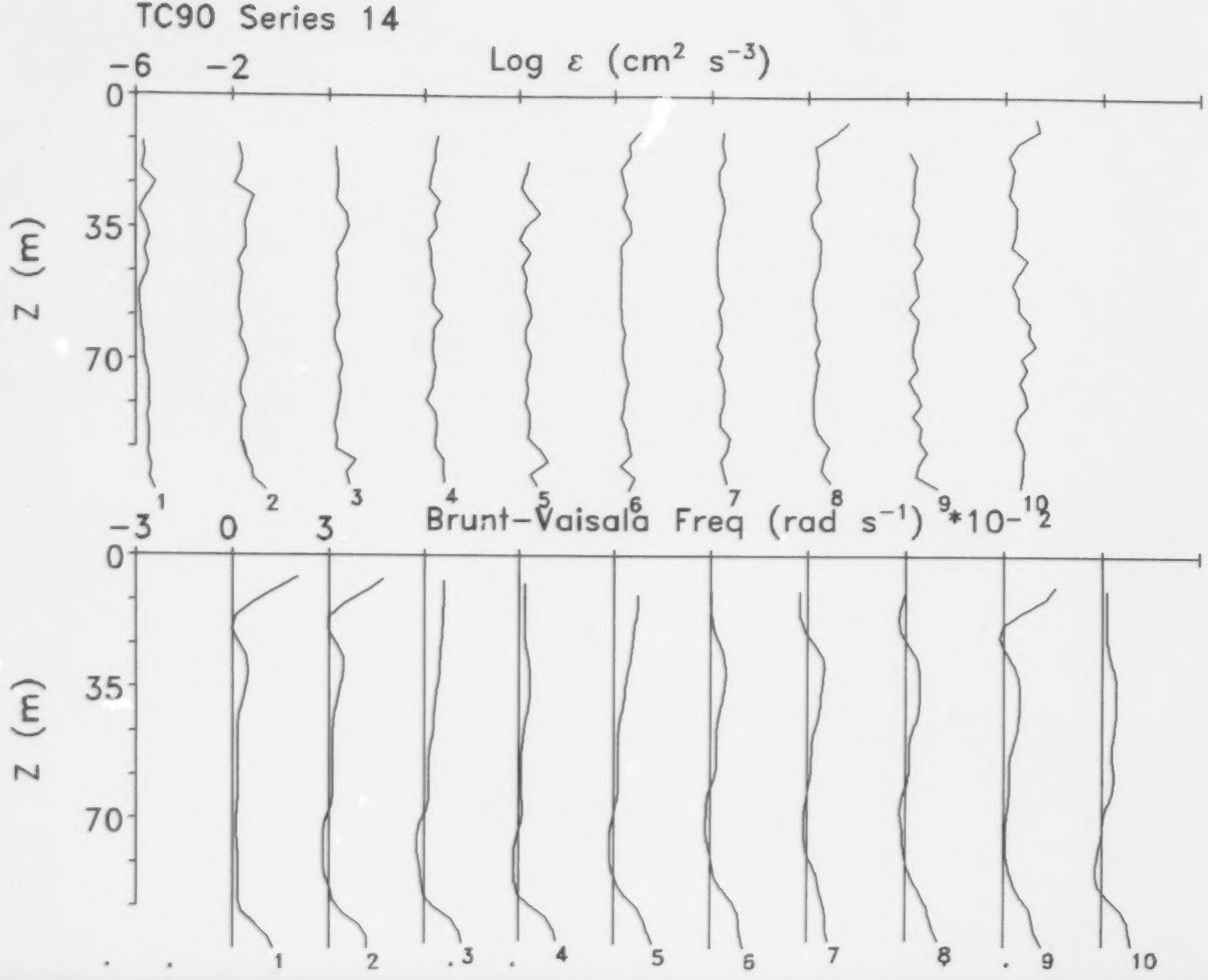

TC90 Series 13
12 13 14
Temperature (deg C)
0
35
70
Z (m)
11 12 13 14 15 16 17 18 19 20
329 331 333
Salinity *10- 1
0
35
70
Z (m)
11 12 13 14 15 16 17 18 19 20

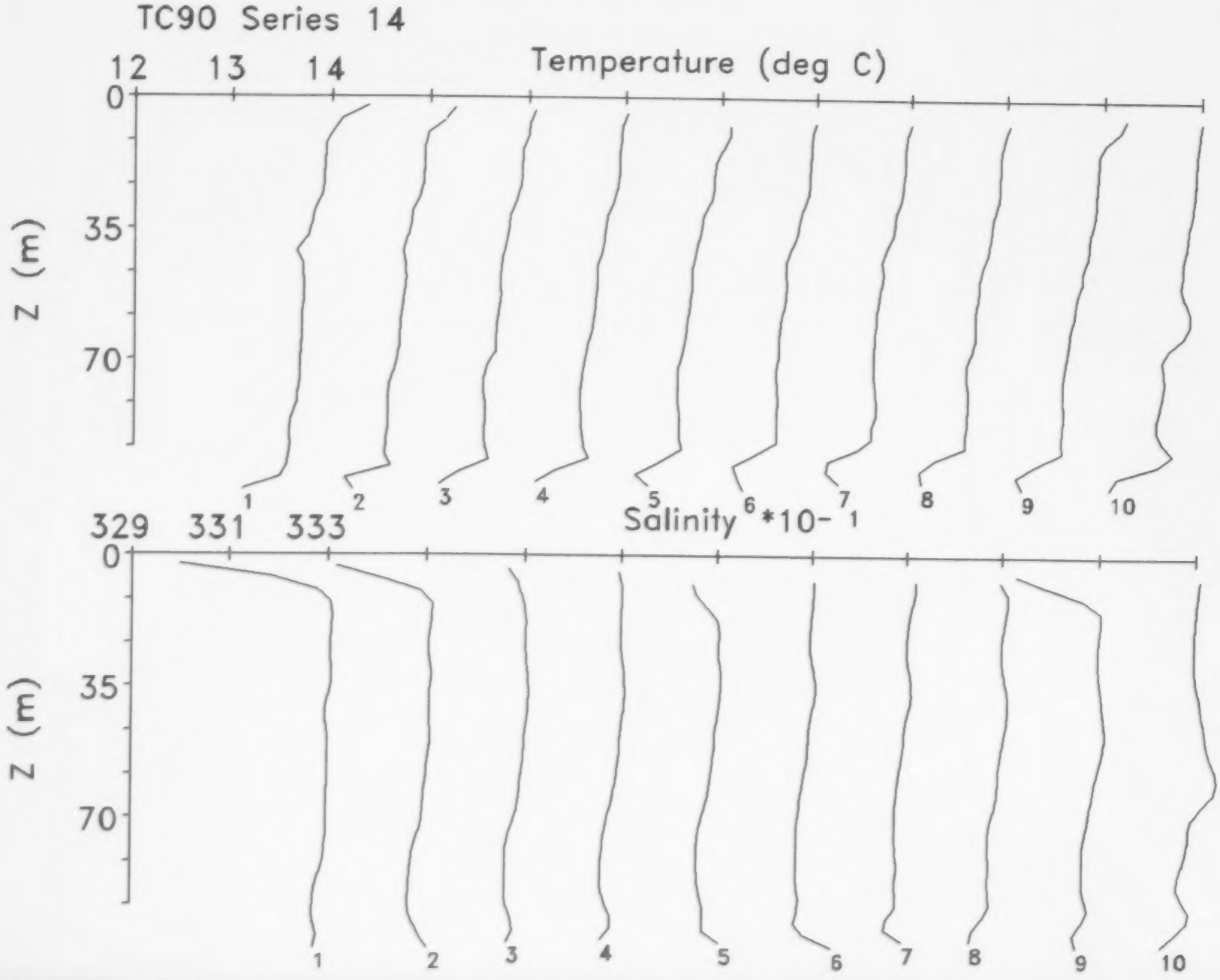

TC90 Series 13
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
21
22
23
24
25
26
27
28
29
30
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
21
22
23
24
25
26
27
28
29
30

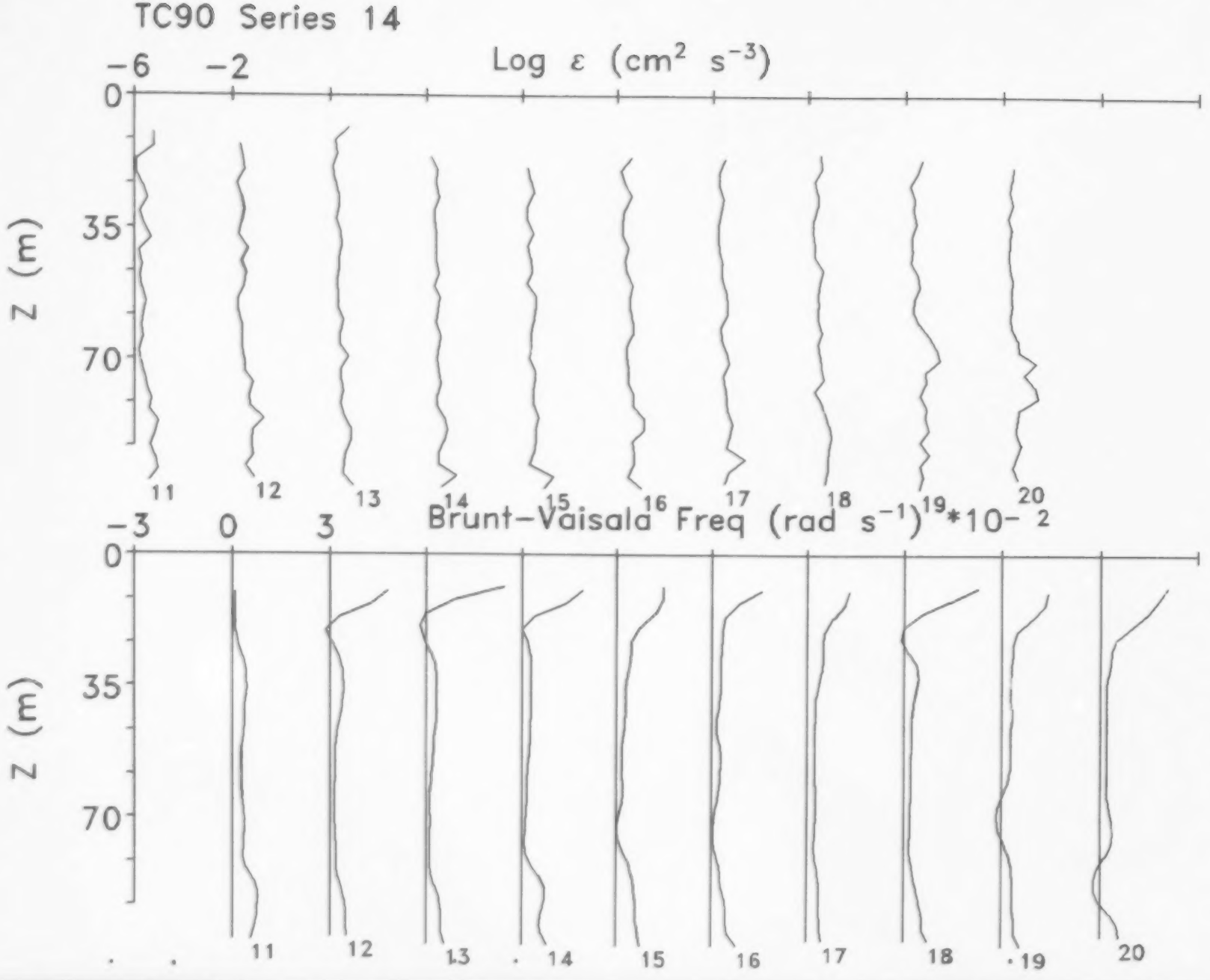

TC90 Series 13
12
13
14
Temperature (deg C)
0
35
70
Z (m)
21
22
23
24
25
26
27
28
29
30
329
331
333
Salinity *10- 1
0
35
70
Z (m)
21
22
23
24
25
26
27
28
29
30

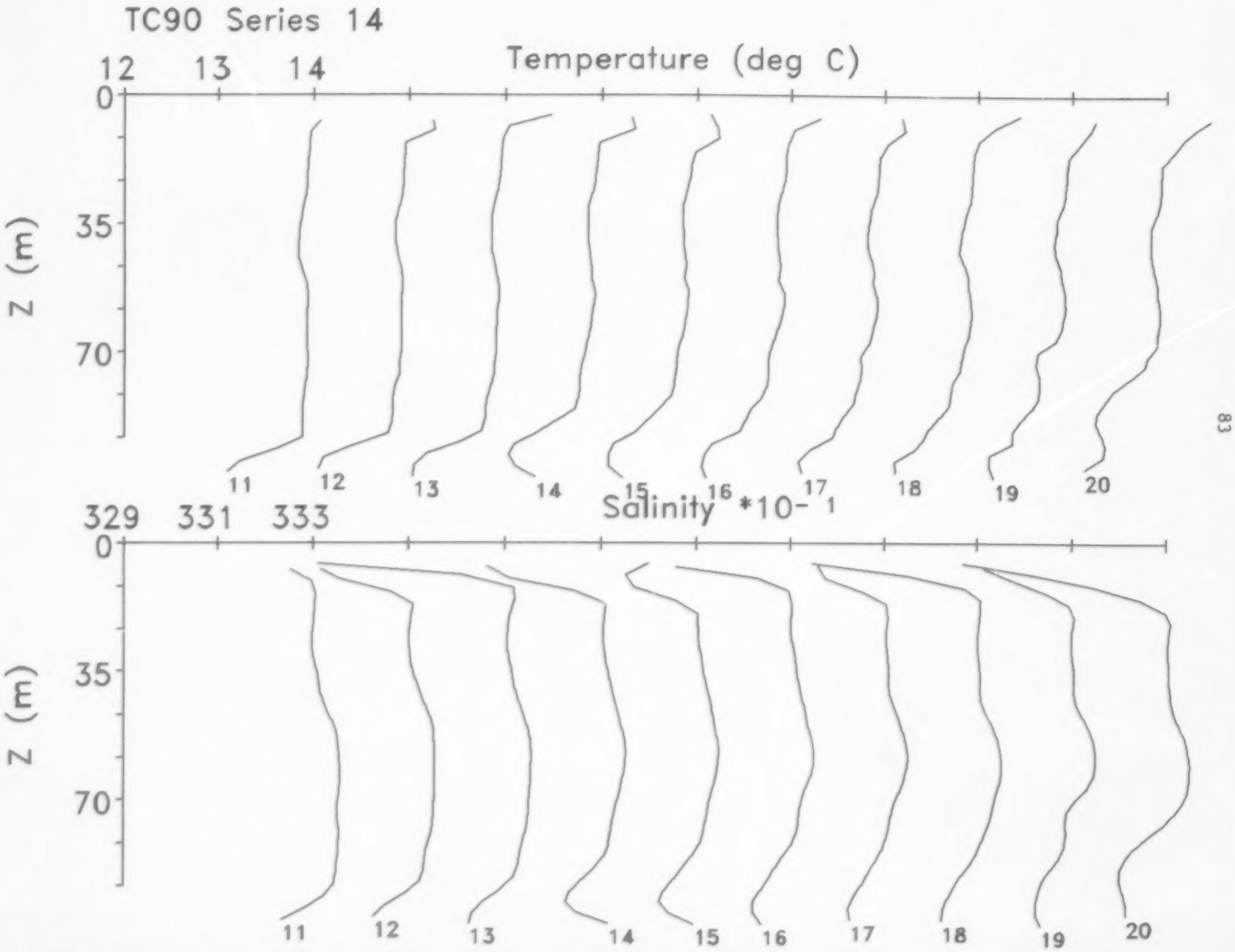

TC90 Series 13
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
31
32
Brunt−Vaisala Freq (rad s⁻¹) *10- 2
−3
0
3
0
35
70
Z (m)
31
32

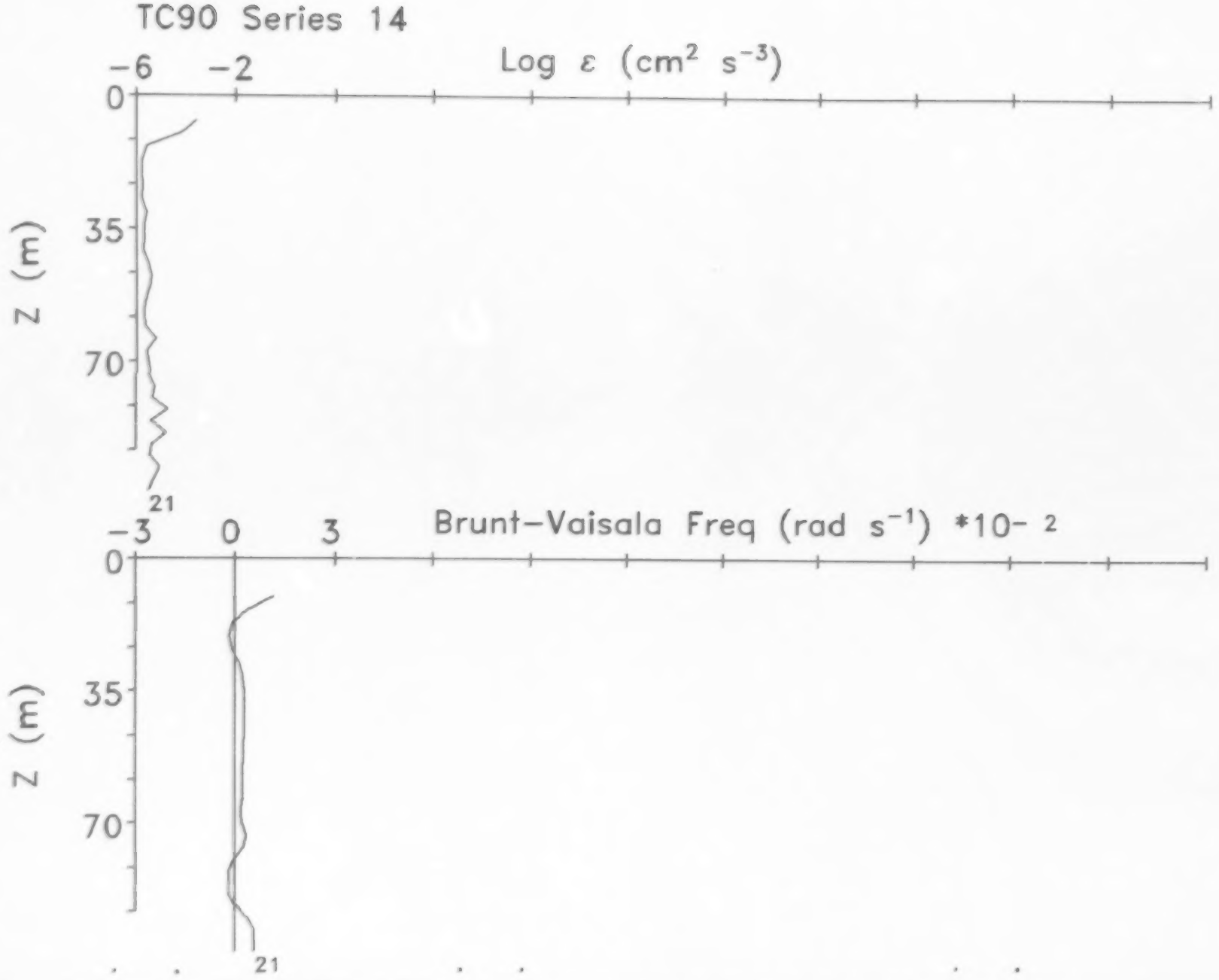

TC90 Series 13
12
13
14
Temperature (deg C)
0
35
70
Z (m)
31
32
329
331
333
Salinity *10- 1
0
35
70
Z (m)
31
32

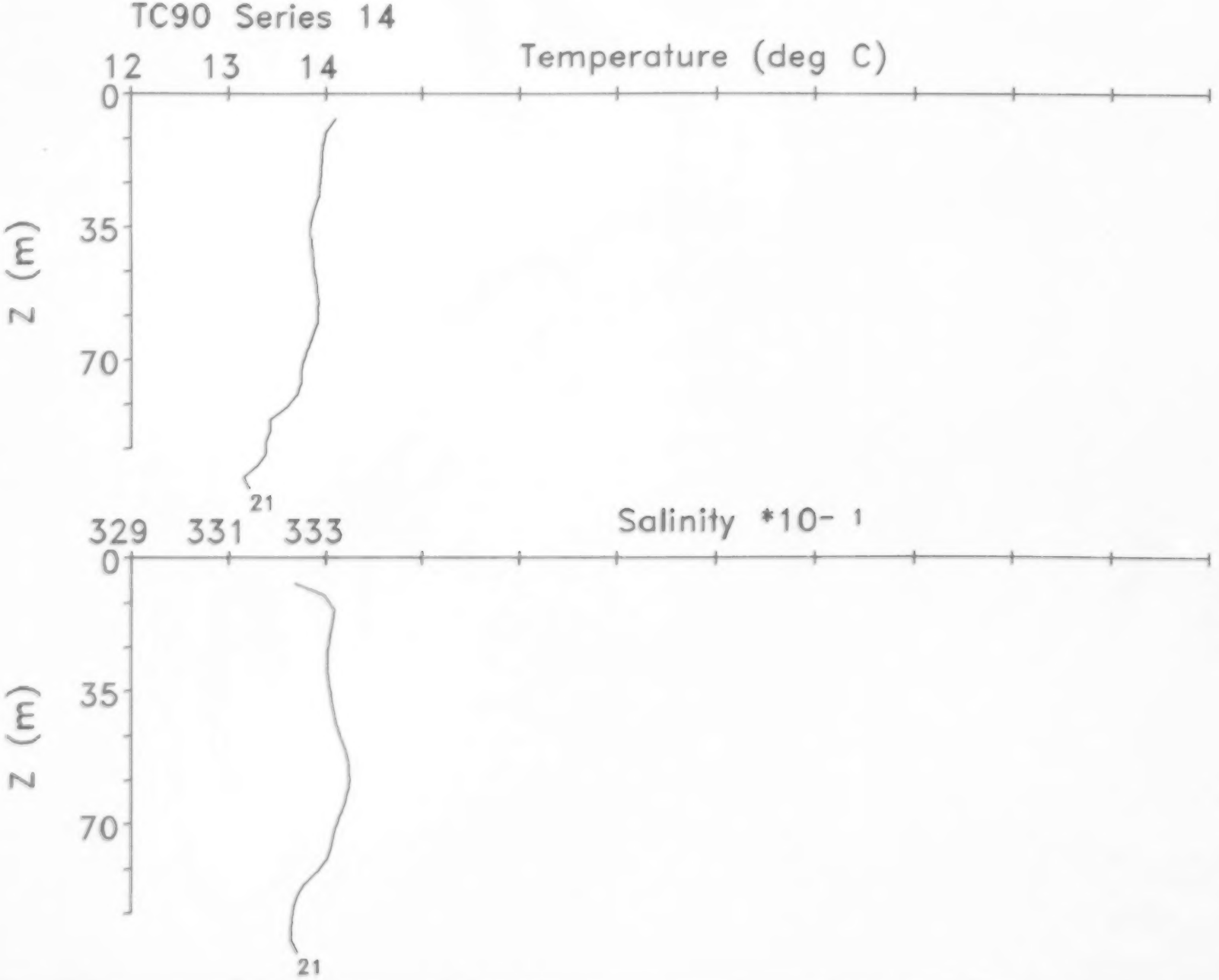

TC90 Series 14
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Brunt-Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10

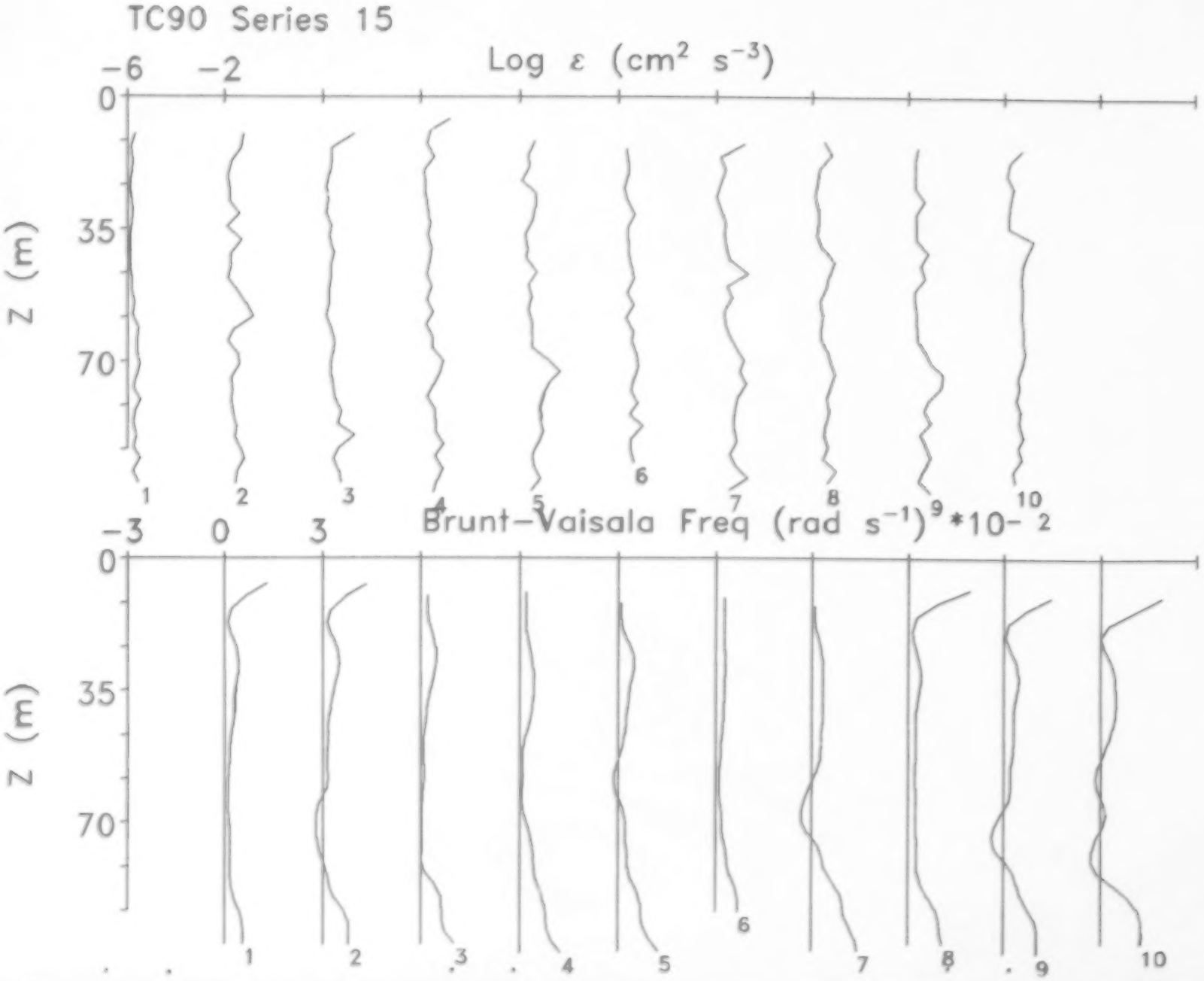

TC90 Series 14
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
329
331
333
Salinity *10-1
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10

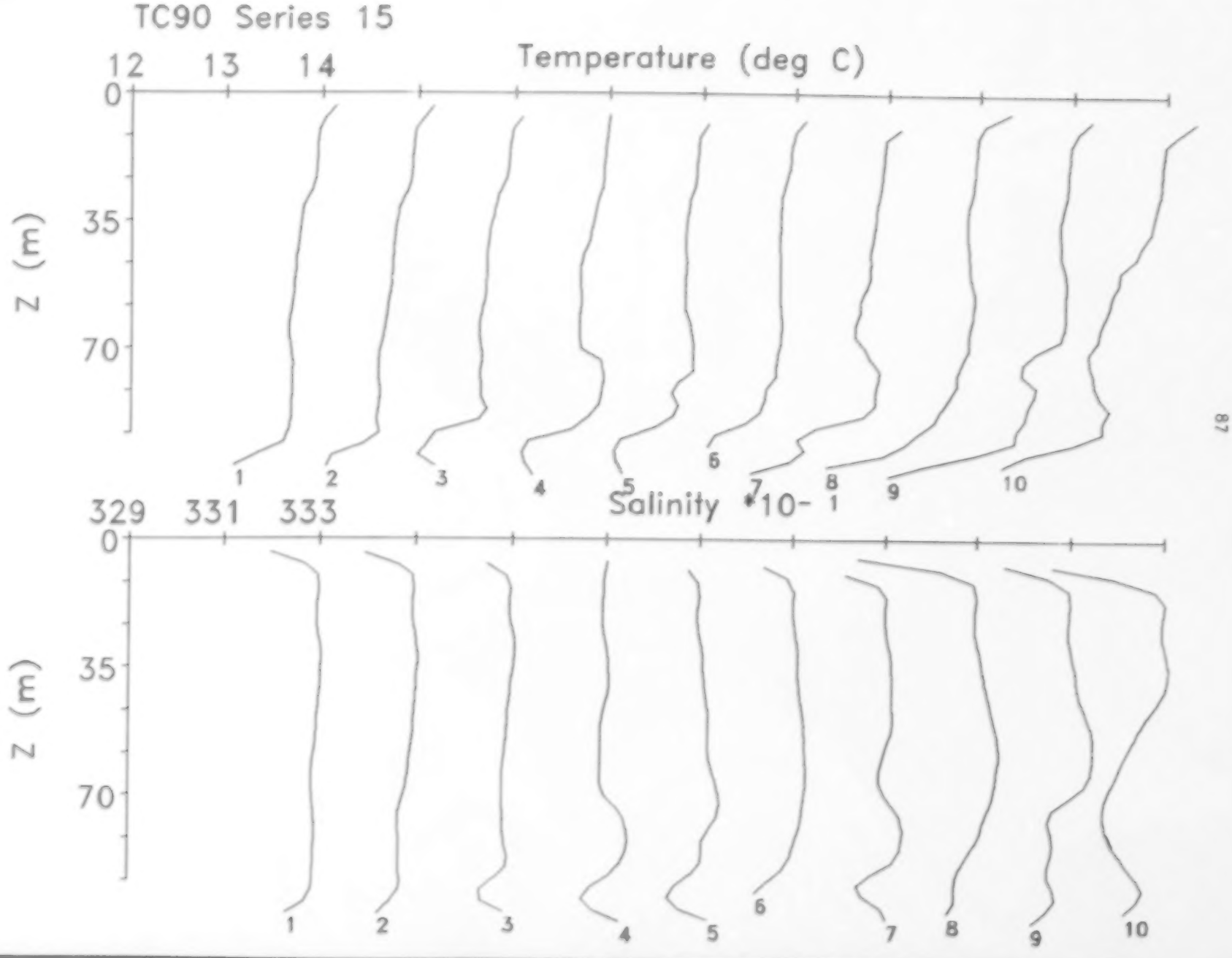

TC90 Series 14
Log ε (cm² s⁻³)
−6
−2
0
35
70
z (m)
11
12
13
14
15
16
17
18
19
20
Brunt−Vaisala Freq (rad s⁻¹)²*10⁻²
−3
0
3

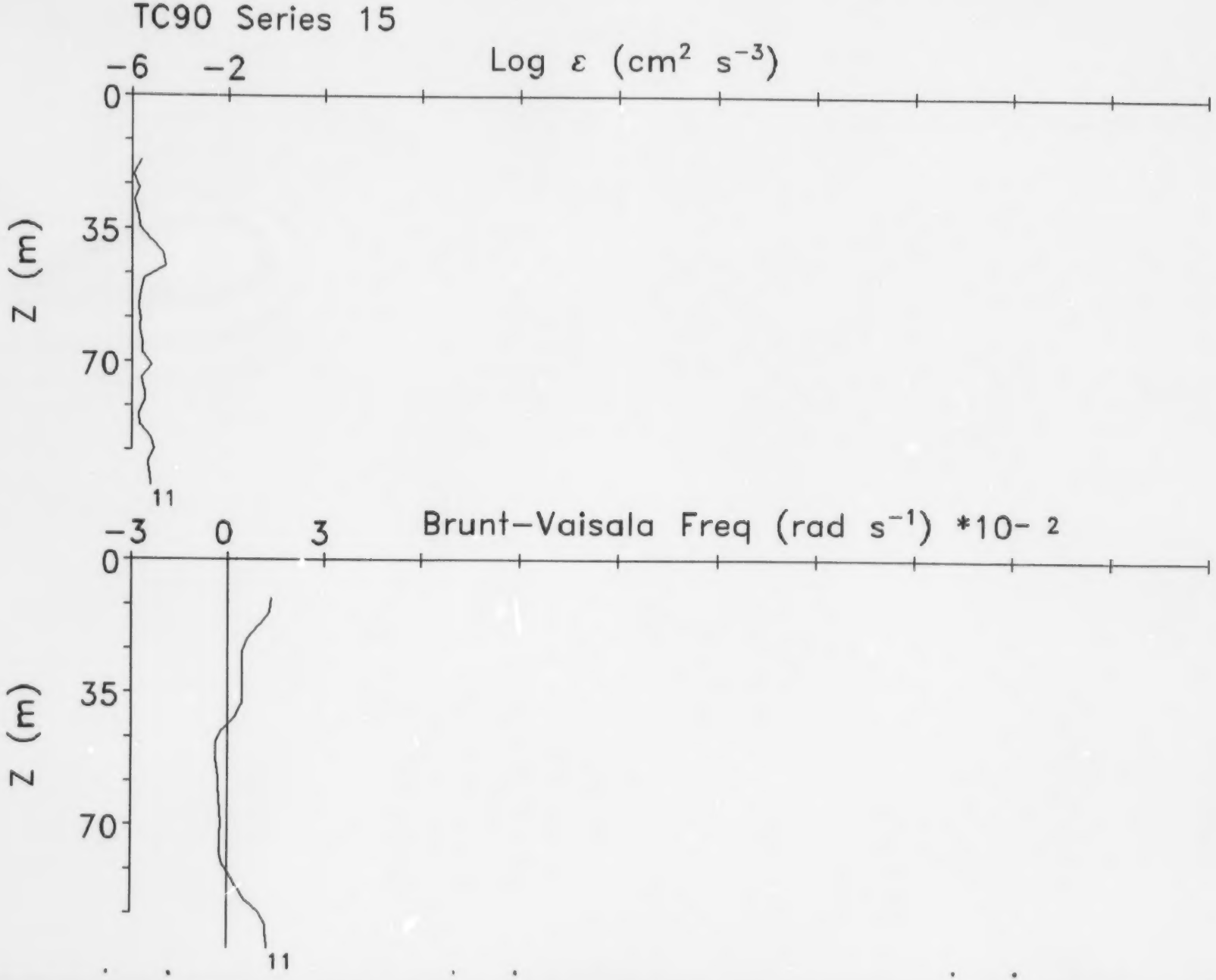

TC90 Series 14
Temperature (deg C)
12
13
14
0
35
70
Z (m)
11
12
13
14
15
16
17
18
19
20
Salinity *10-1
329
331
333
0
35
70
Z (m)
11
12
13
14
15
16
17
18
19
20

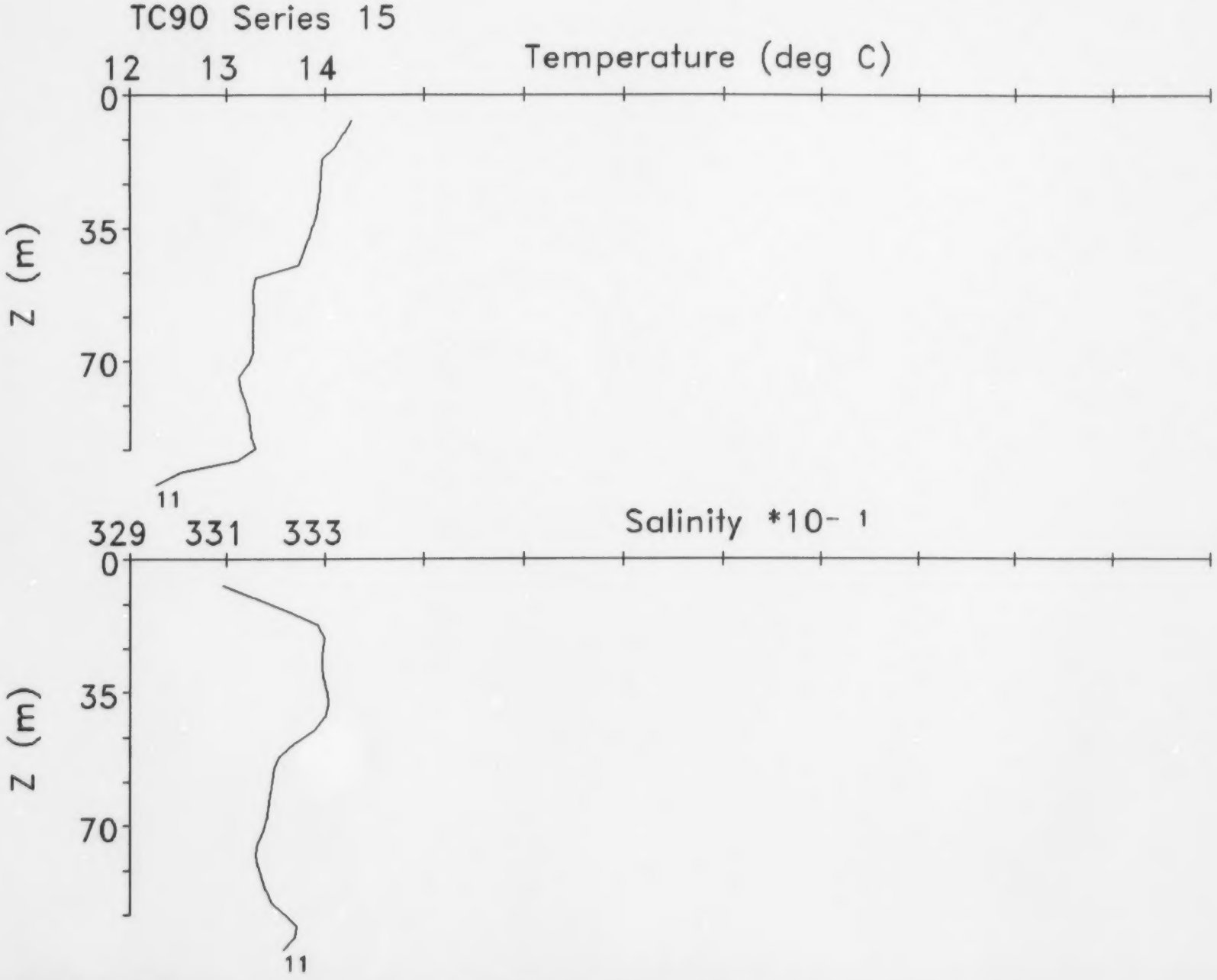

TC90 Series 14
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
21
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
21

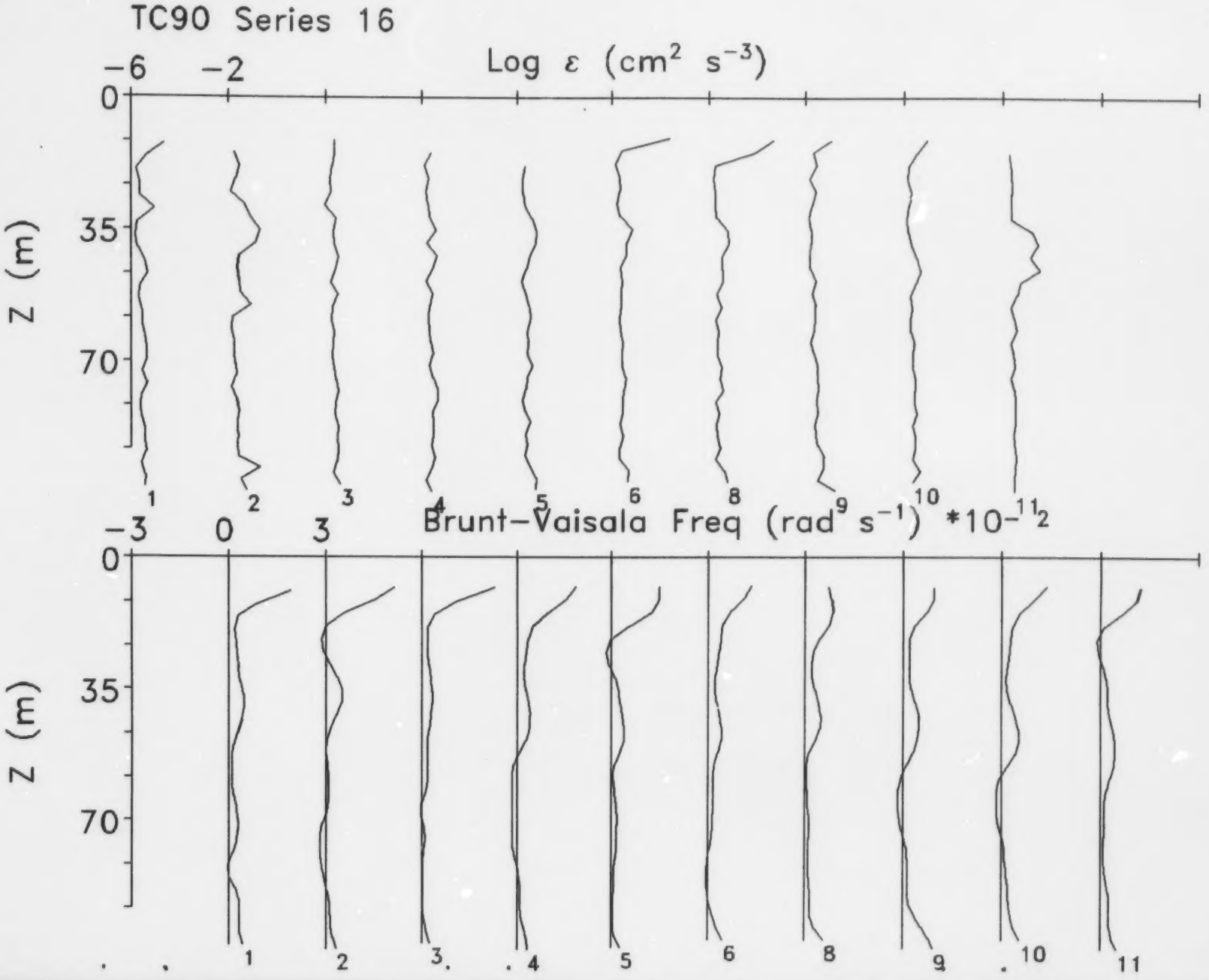

TC90 Series 14
12
13
14
Temperature (deg C)
0
35
70
Z (m)
21
329
331
333
Salinity *10- 1
0
35
70
Z (m)
21

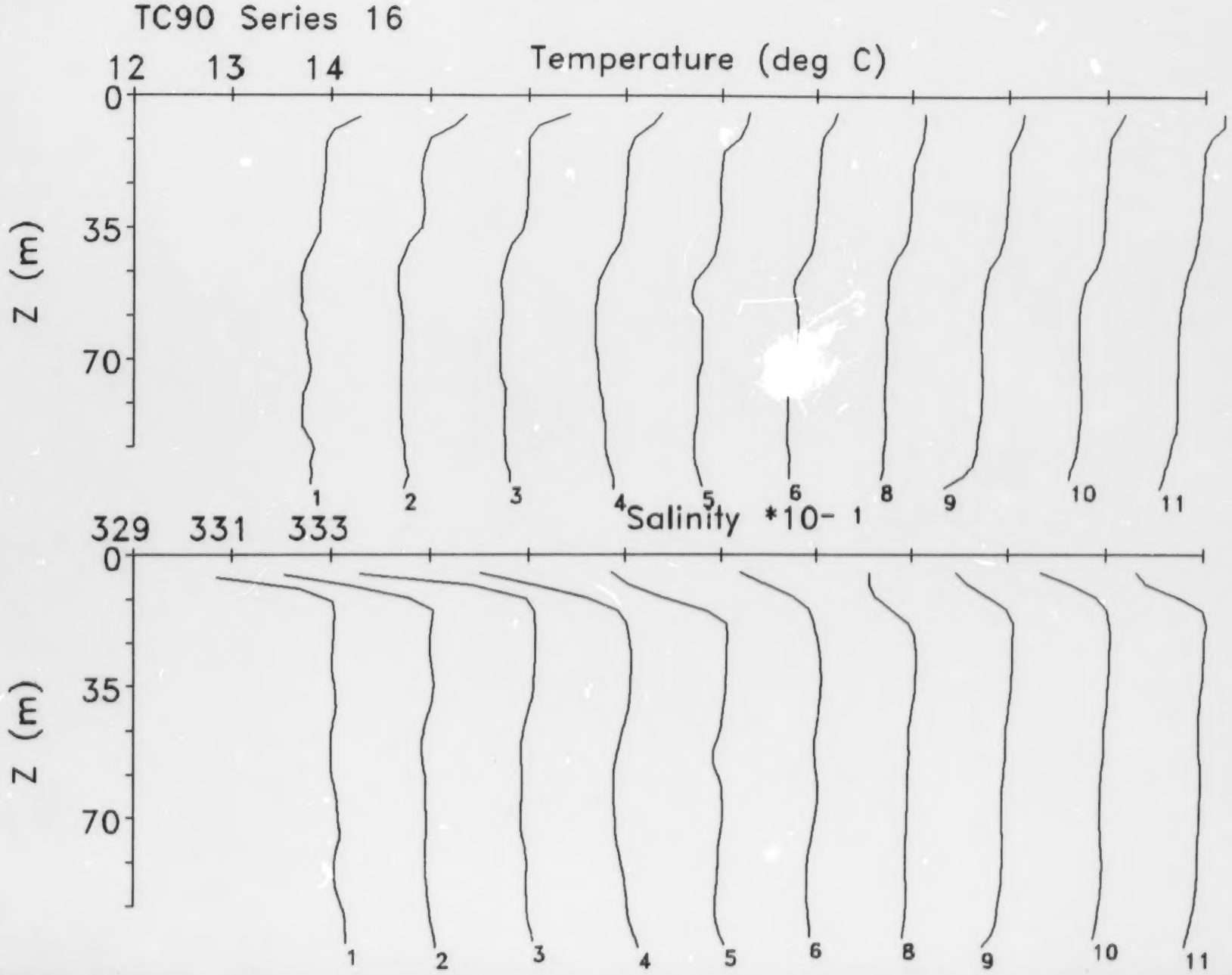

TC90 Series 15
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Brunt−Vaisala Freq (rad s⁻¹)² *10⁻²
−3
0
3
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10

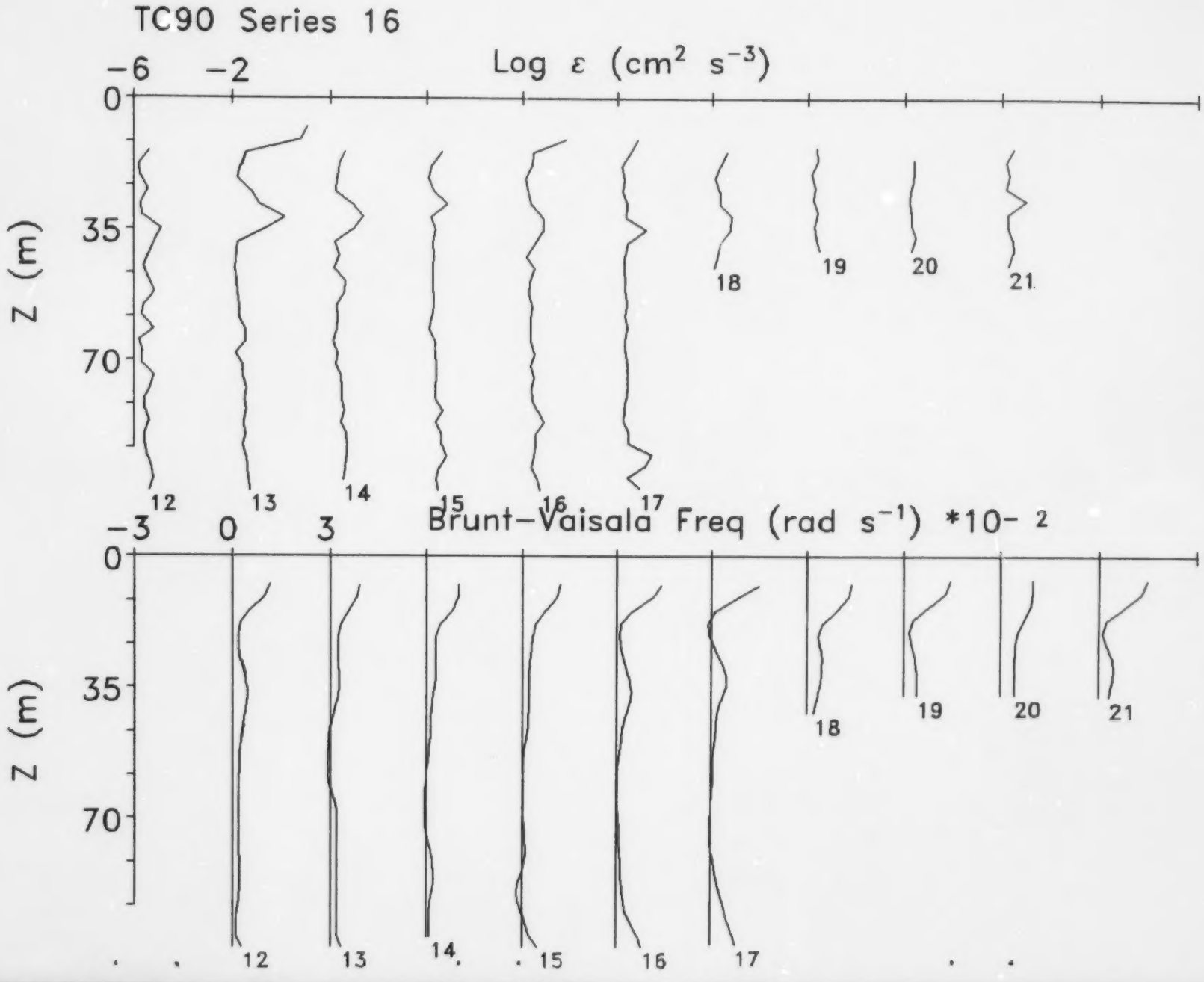

TC90 Series 15
Temperature (deg C)
12
13
14
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Salinity *10-1
329
331
333
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10

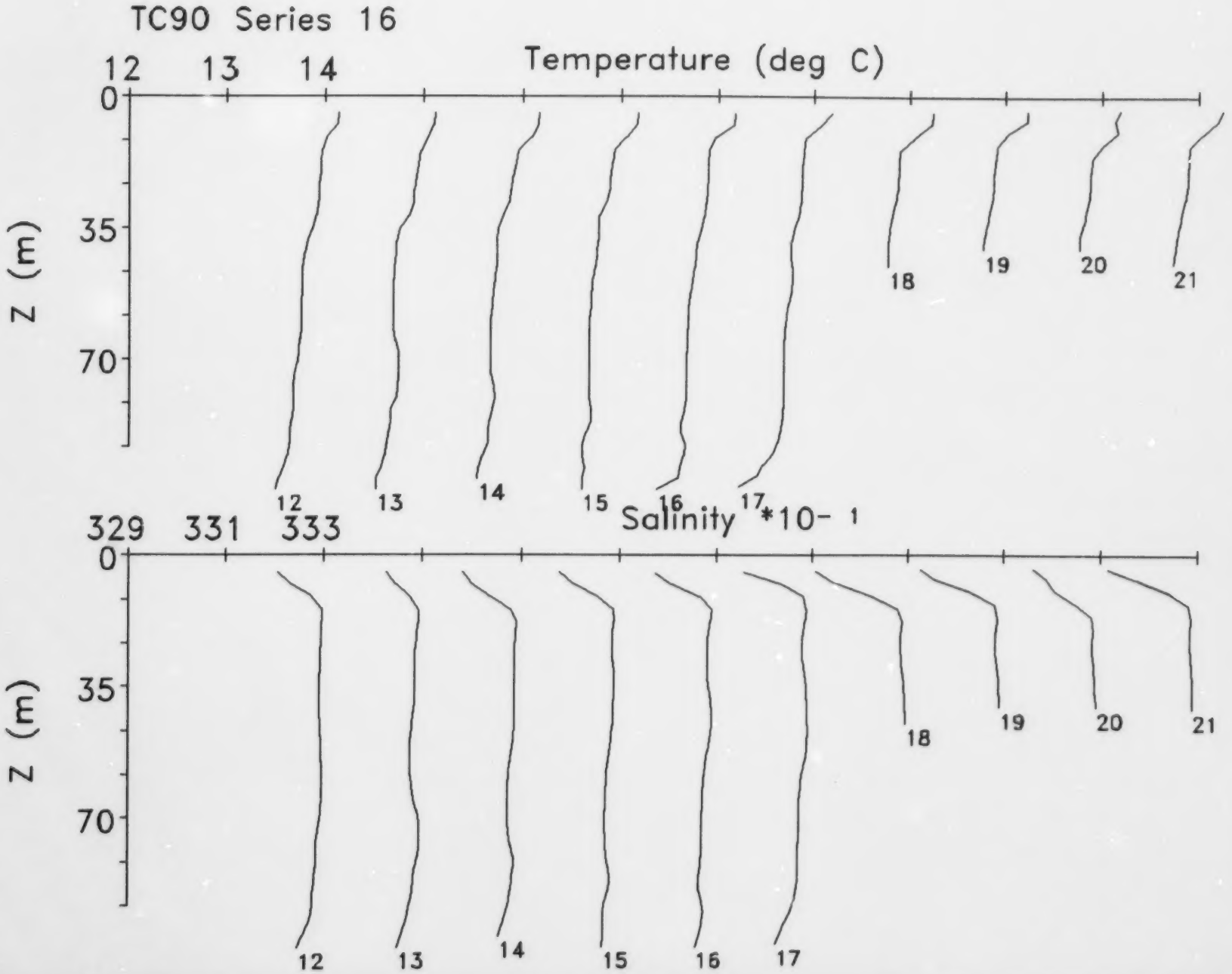

TC90 Series 15
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
11
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
35
70
Z (m)
11

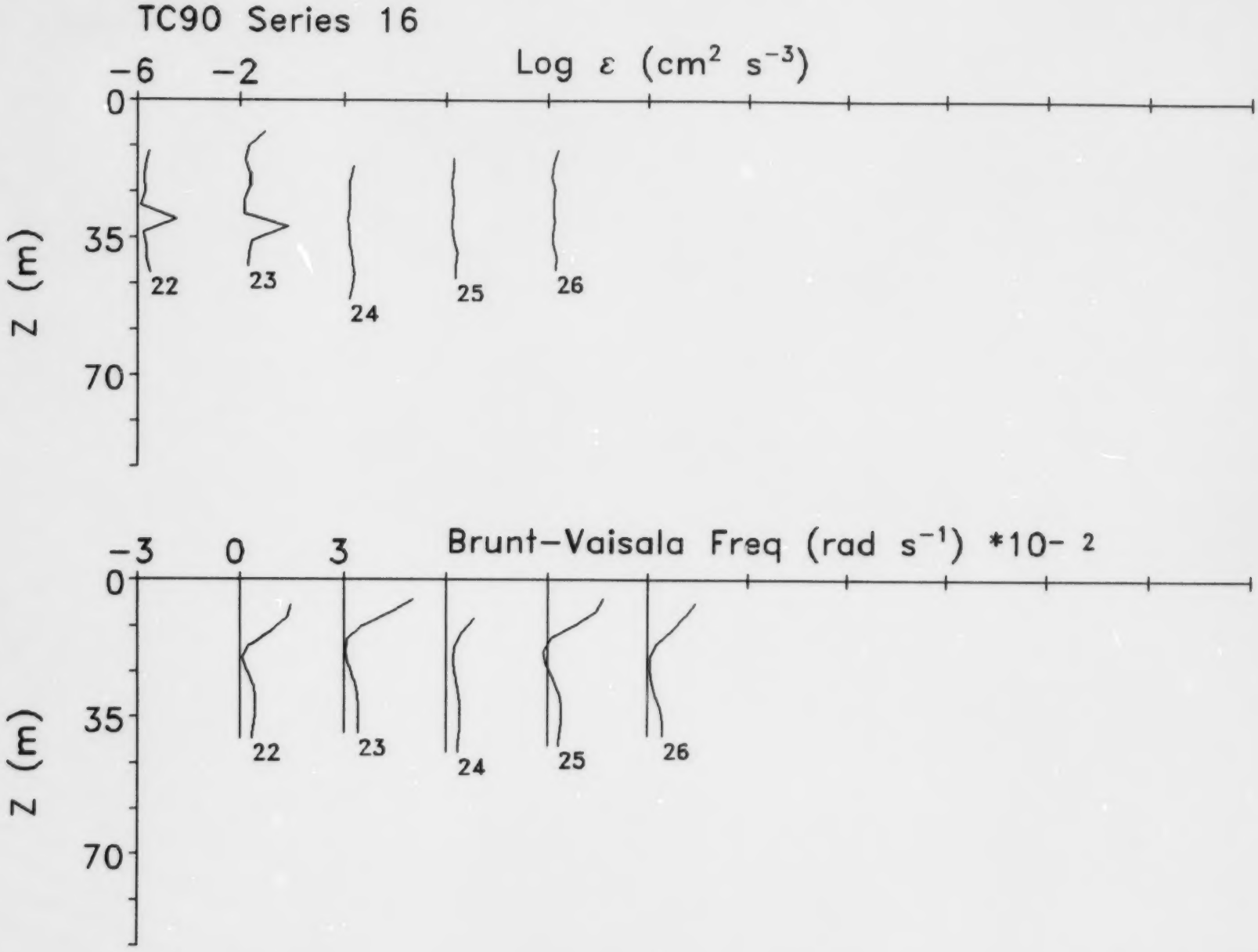

TC90 Series 15
Temperature (deg C)
12
13
14
0
35
70
Z (m)
11
Salinity *10- 1
329
331
333
0
35
70
Z (m)
11

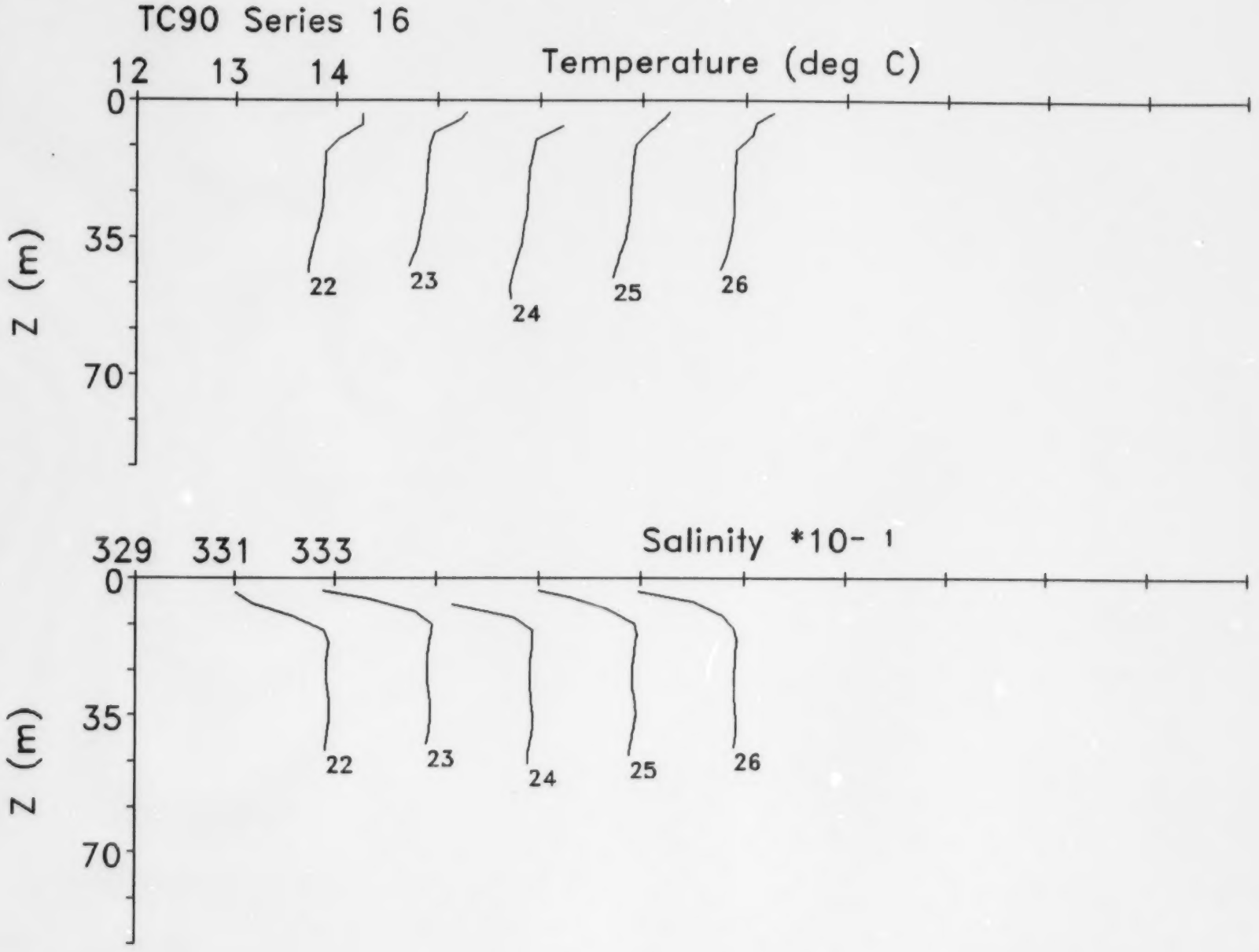

TC90 Series 16
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
4
5
6
8
9
10
Brunt−Vaisala Freq (rad² s⁻¹) *10⁻¹½
−3
0
3
0
35
70
Z (m)
1
2
3
4
5
6
8
9
10
11

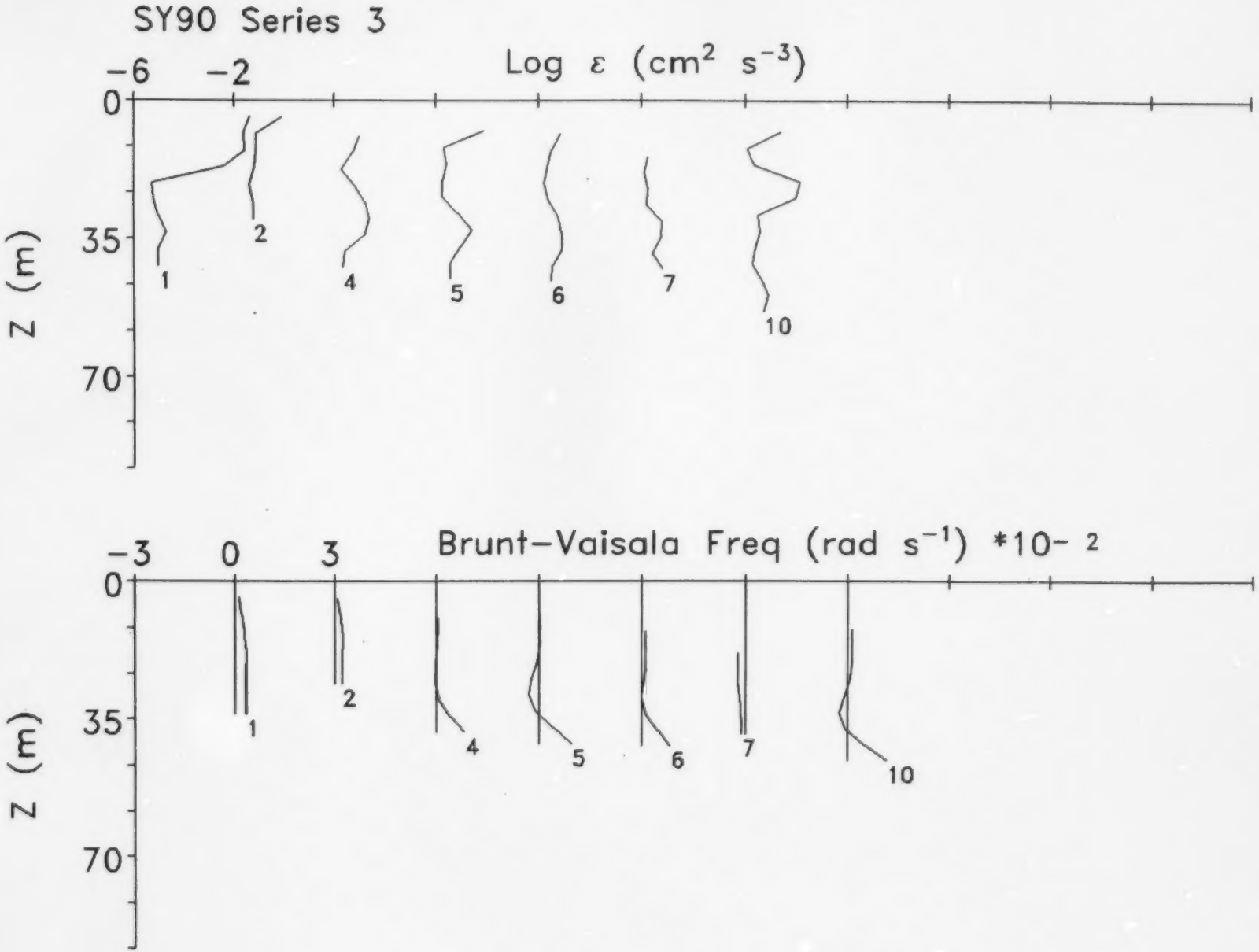

TC90 Series 16
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
4
5
6
8
9
10
11
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2
3
4
5
6
8
9
10
11

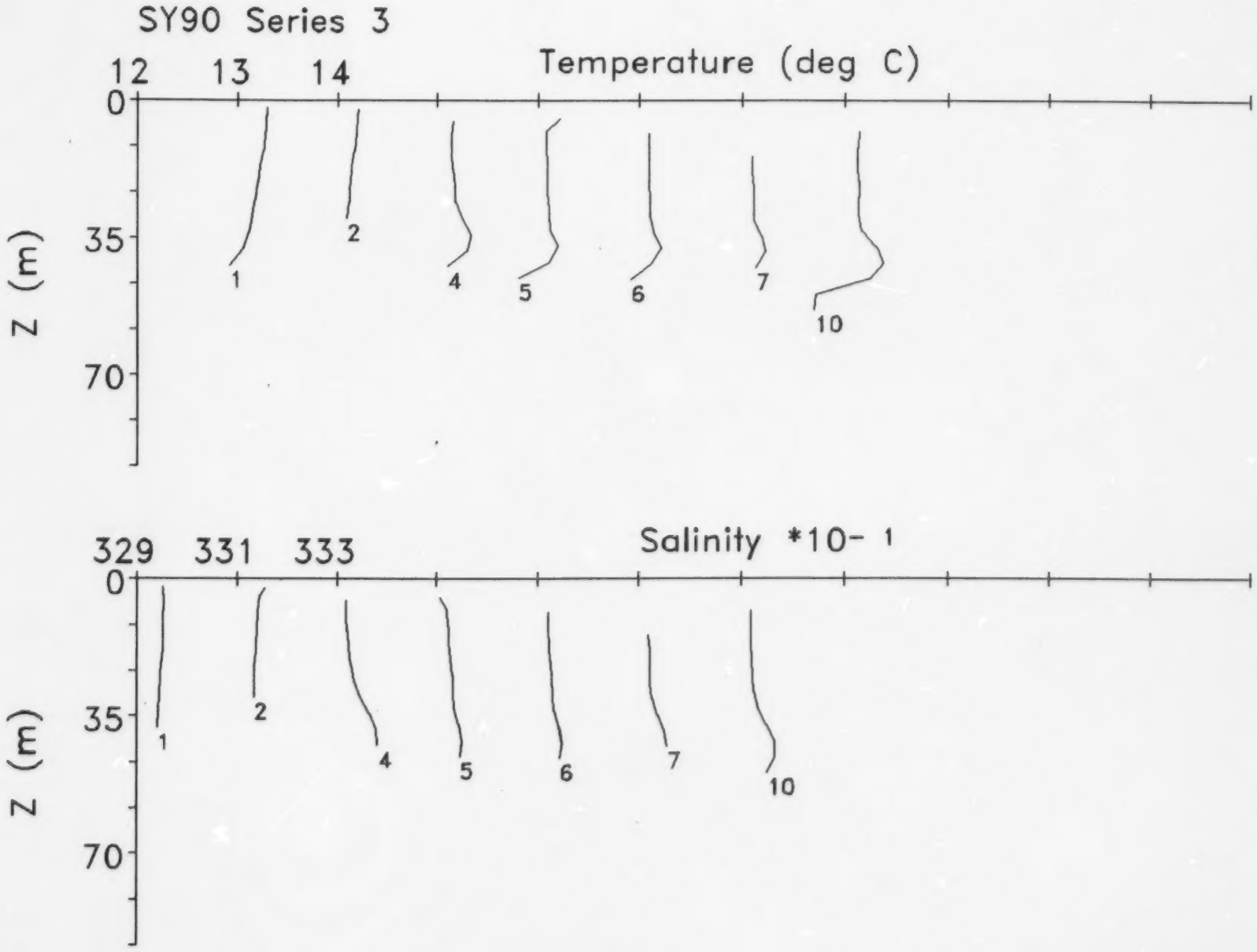

TC90 Series 16
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
12
13
14
15
16
17
18
19
20
21
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3

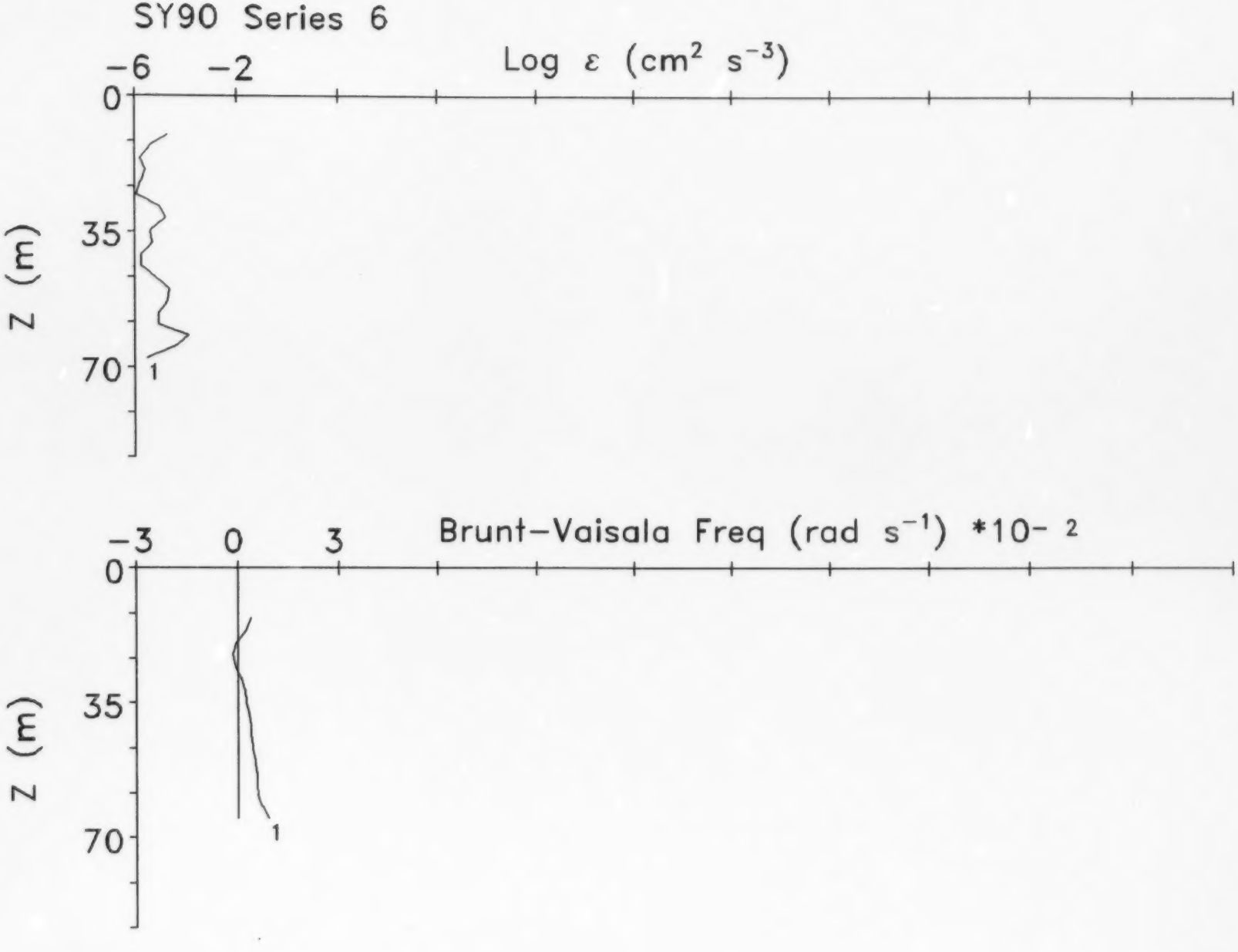

TC90 Series 16
Temperature (deg C)
12
13
14
0
35
70
Z (m)
12
13
14
15
16
17
18
19
20
21
Salinity *10- 1
329
331
333
0
35
70
Z (m)
12
13
14
15
16
17
18
19
20
21

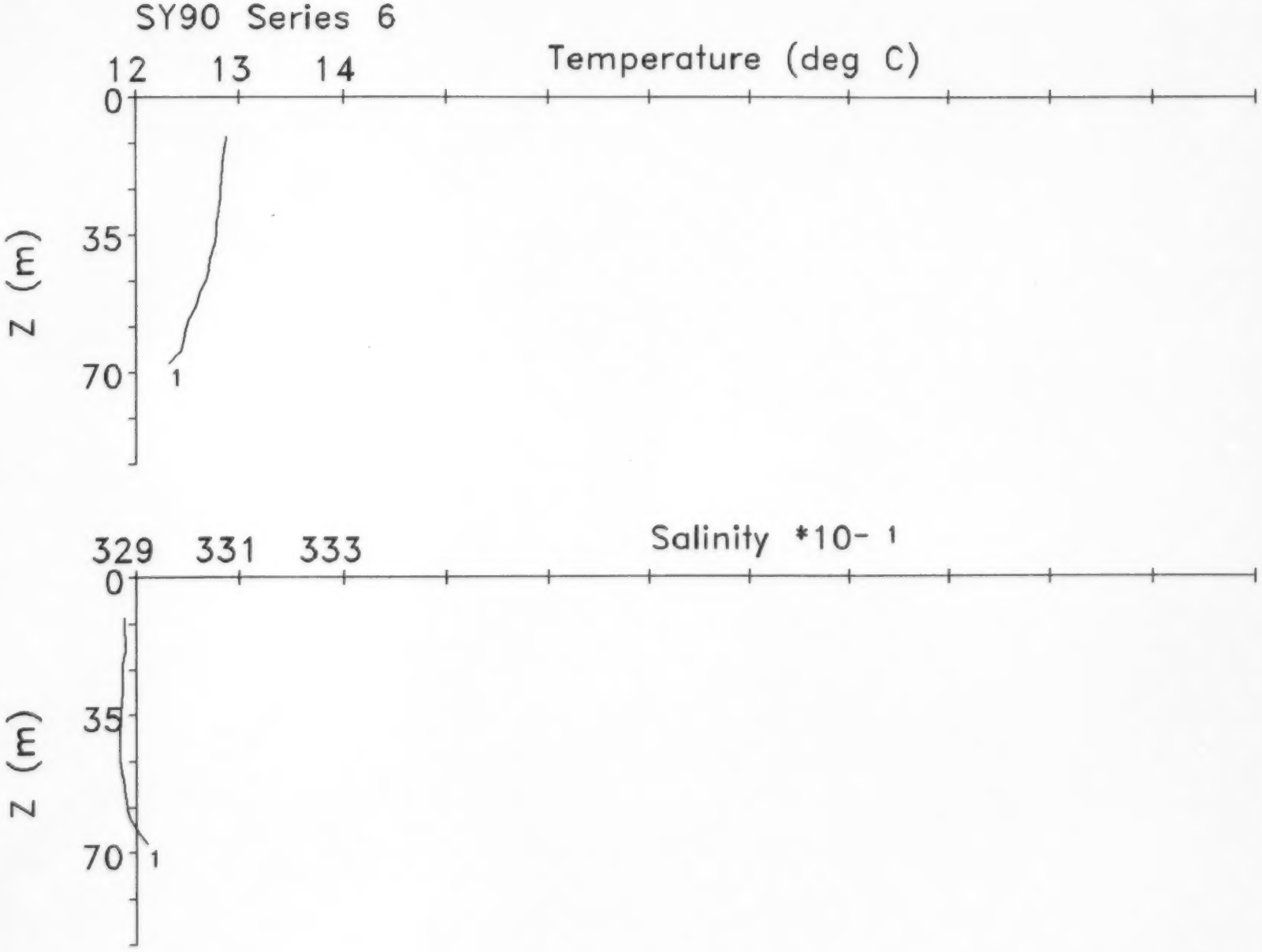

TC90 Series 16
Log ε (cm² s⁻³)
−6
−2
0
35
70
z (m)
22
23
24
25
26
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
35
70
z (m)
22
23
24
25
26

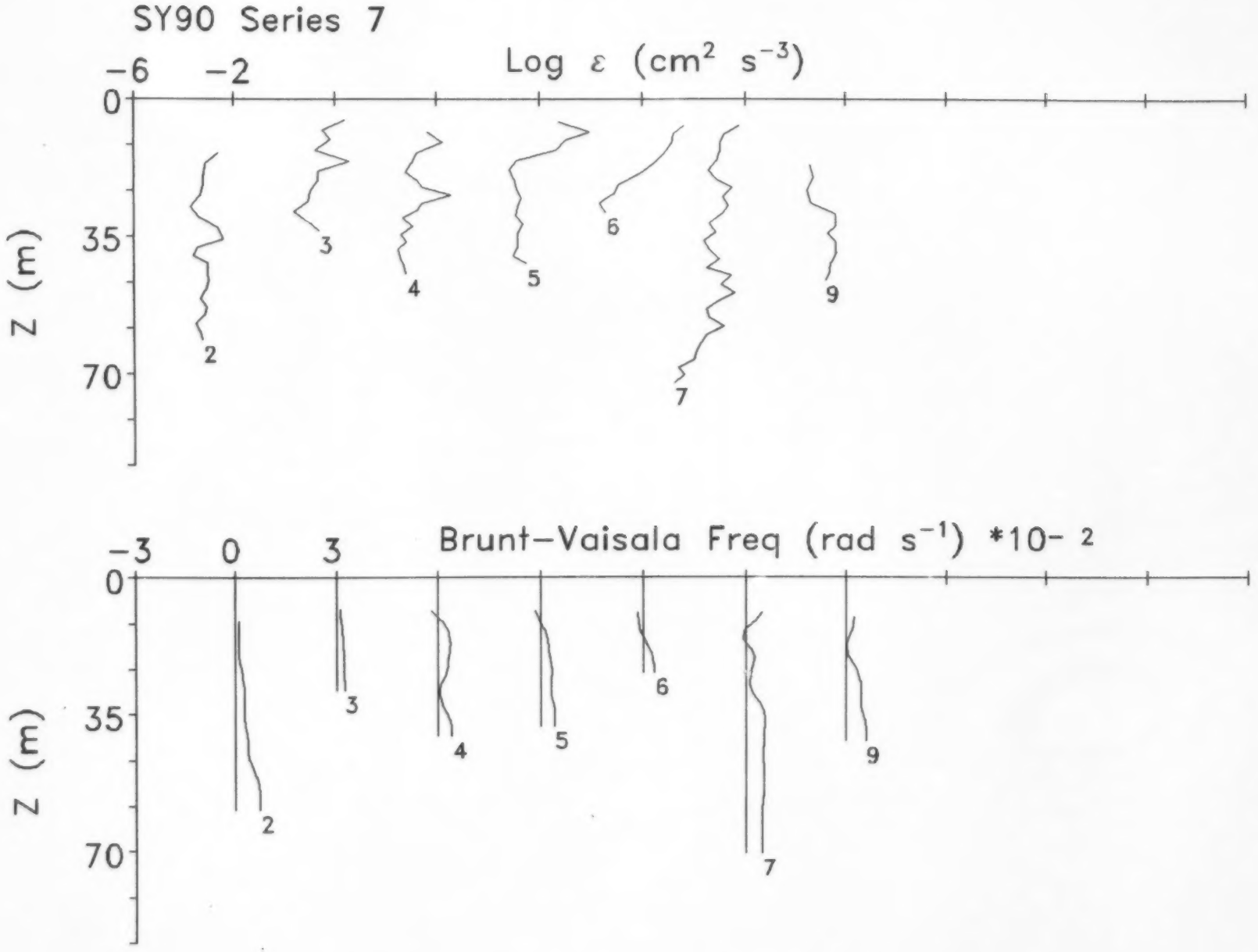

TC90 Series 16
12
13
14
Temperature (deg C)
0
35
70
Z (m)
22
23
24
25
26
329
331
333
Salinity *10- 1
0
35
70
Z (m)
22
23
24
25
26

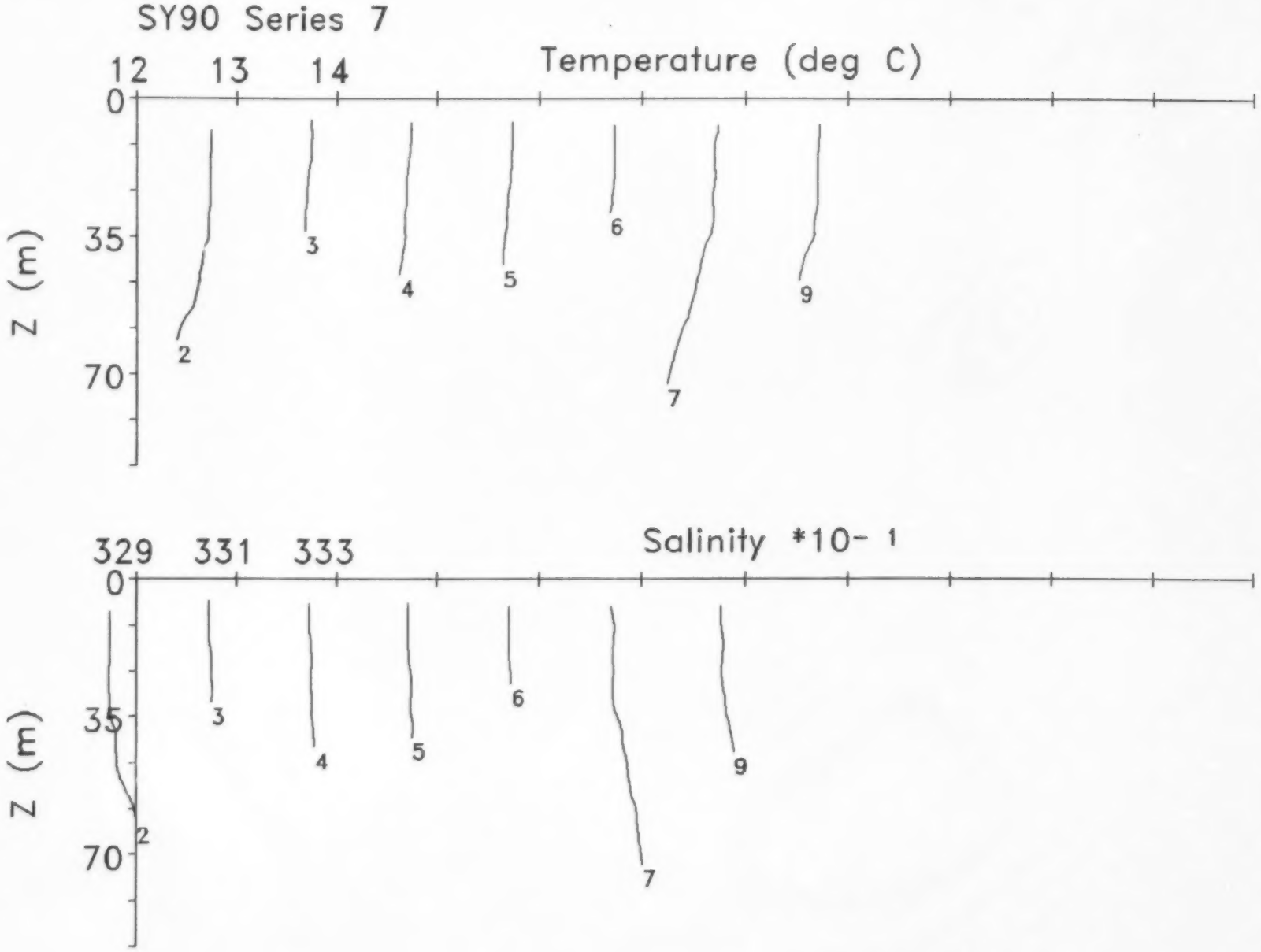

SY90 Series 3
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
4
5
6
7
10
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
35
70
Z (m)
1
2
4
5
6
7
10

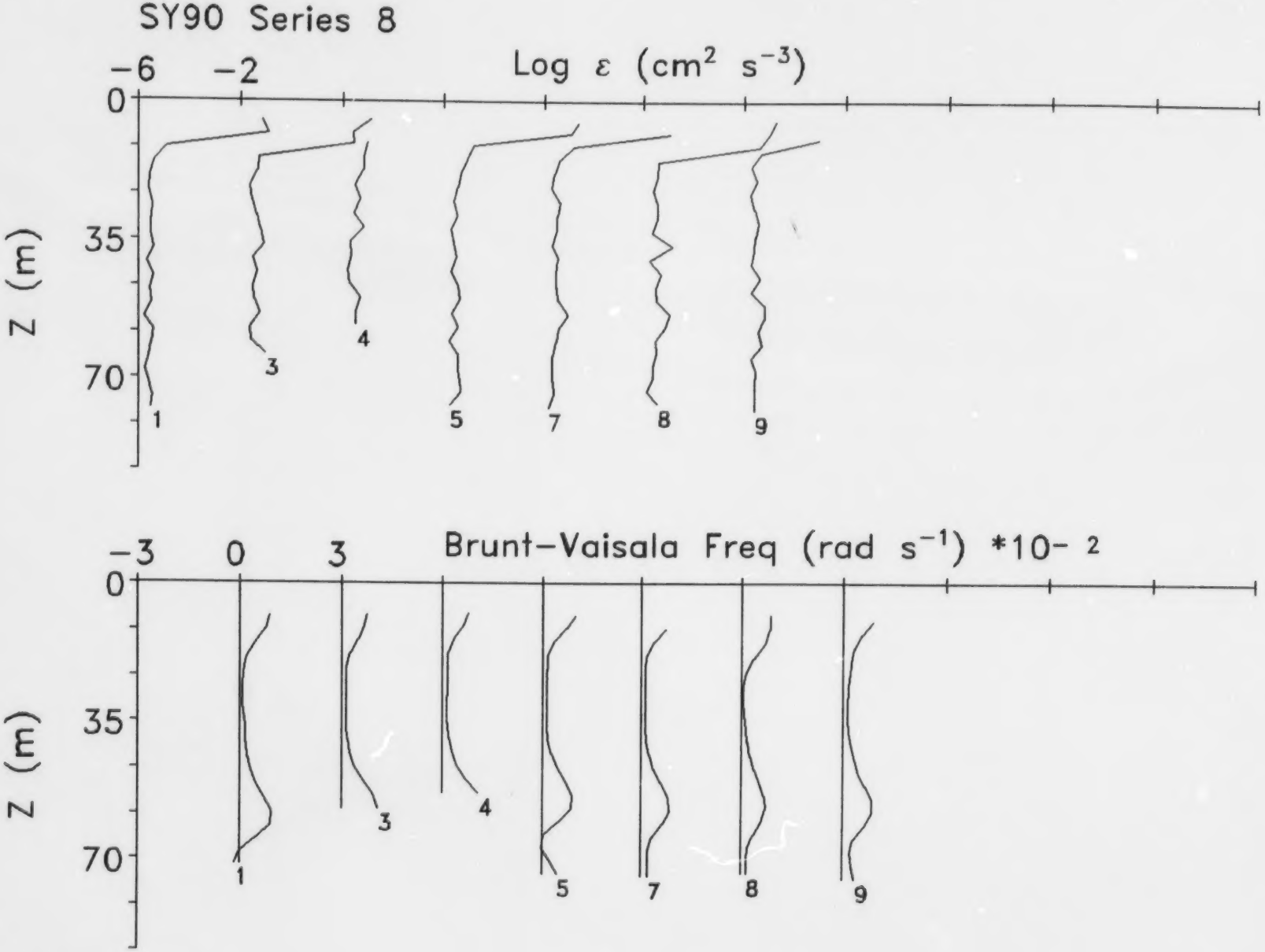

SY90 Series 3
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
4
5
6
7
10
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2
4
5
6
7
10

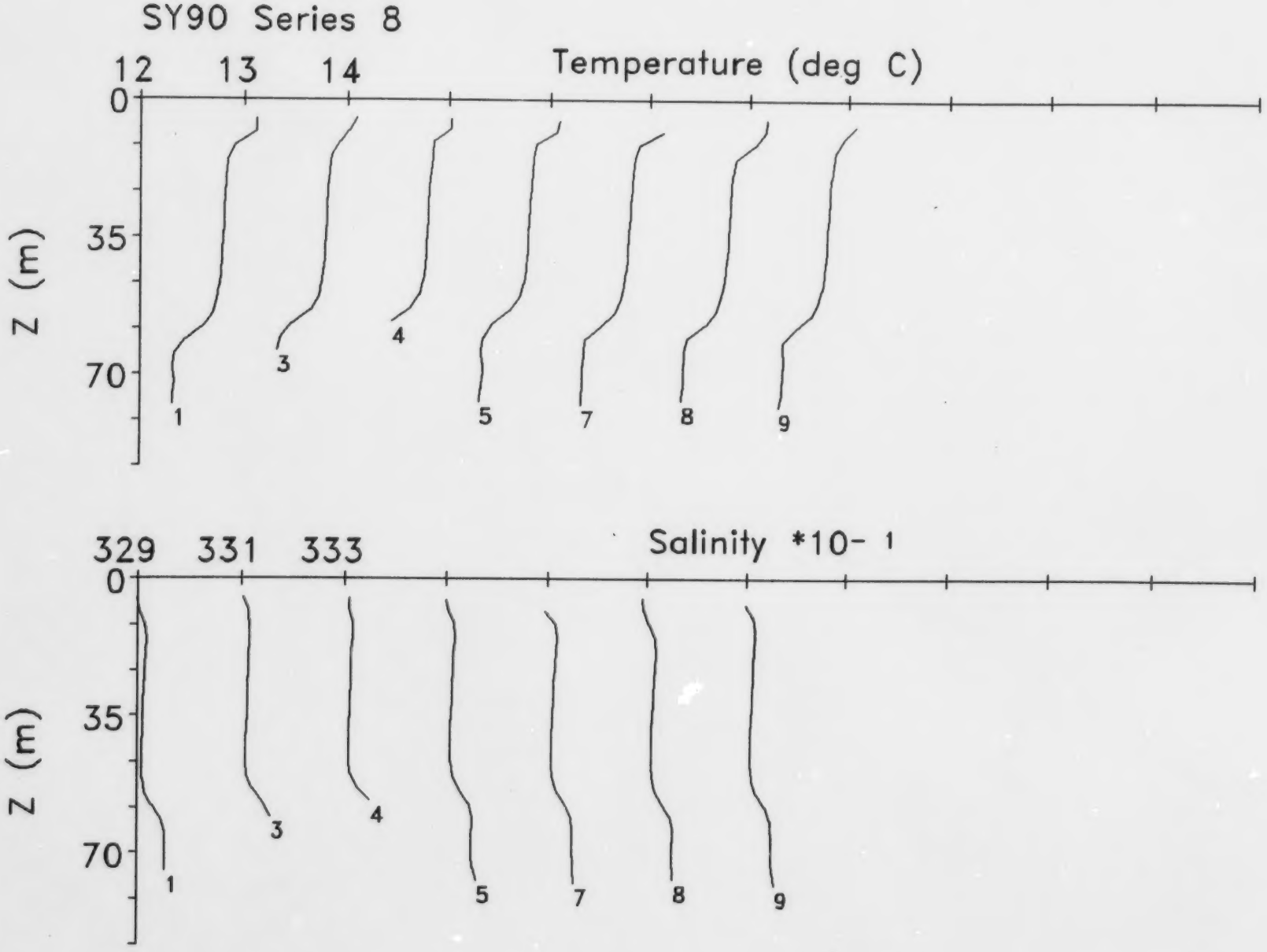

SY90 Series 6
−6
−2
Log ε (cm² s⁻³)
0
35
70
Z (m)
1
−3
0
3
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
0
35
70
Z (m)
1

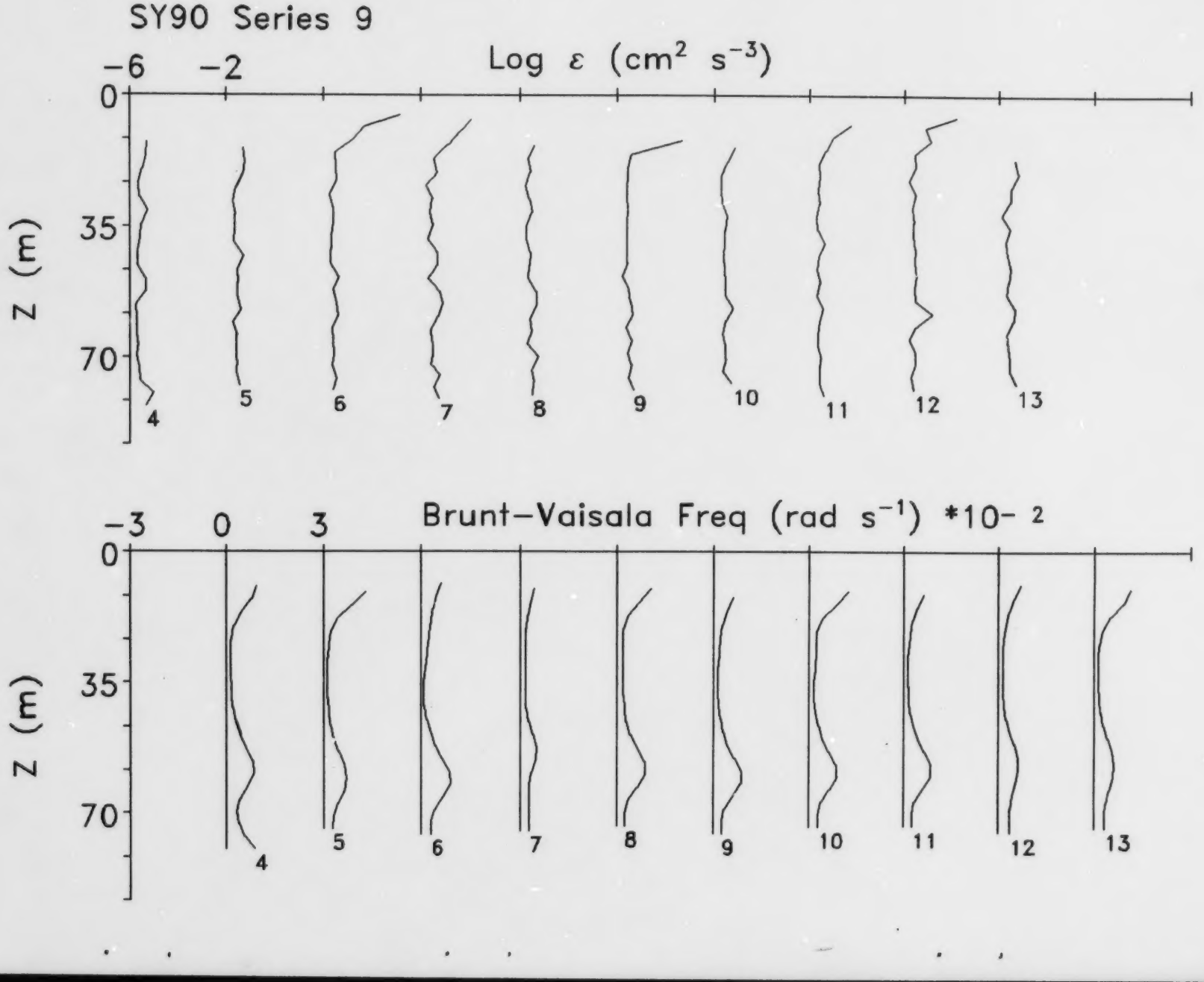

SY90 Series 6
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1


SY90 Series 7
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
2
3
4
5
6
7
9
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
35
70
Z (m)
2
3
4
5
6
7
9


SY90 Series 7
12
13
14
Temperature (deg C)
0
35
70
Z (m)
2
3
4
5
6
7
9
329
331
333
Salinity *10- 1
0
35
70
Z (m)
2
3
4
5
6
7
9


SY90 Series 8
−6
−2
Log ε (cm² s⁻³)
0
35
70
Z (m)
1
3
4
5
7
8
9
−3
0
3
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
0
35
70
Z (m)
1
3
4
5
7
8
9


SY90 Series 8
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
3
4
5
7
8
9
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
3
4
5
7
8
9


SY90 Series 9
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
4
5
6
7
8
9
10
11
12
13
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
35
70
Z (m)
4
5
6
7
8
9
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11
12
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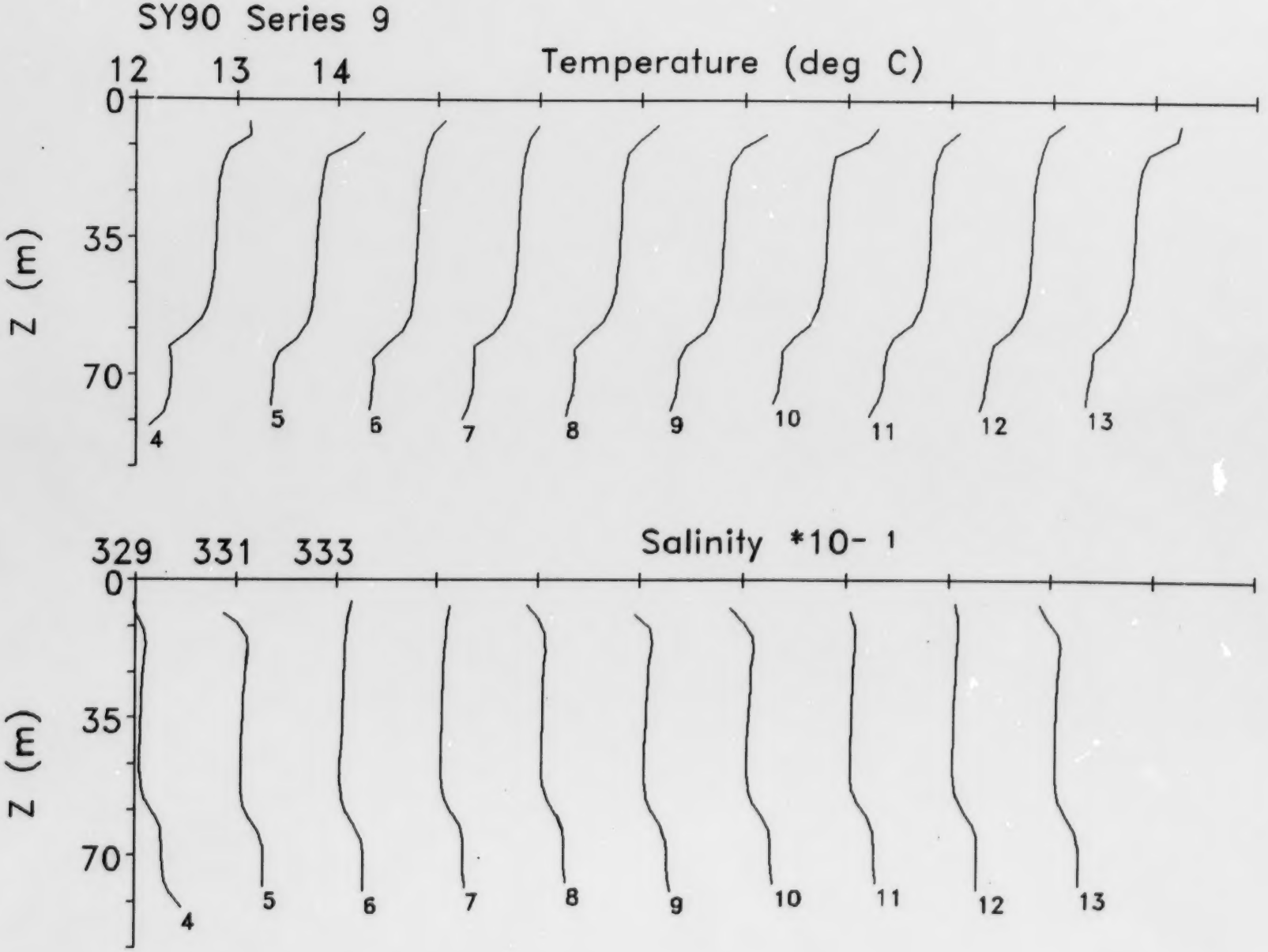
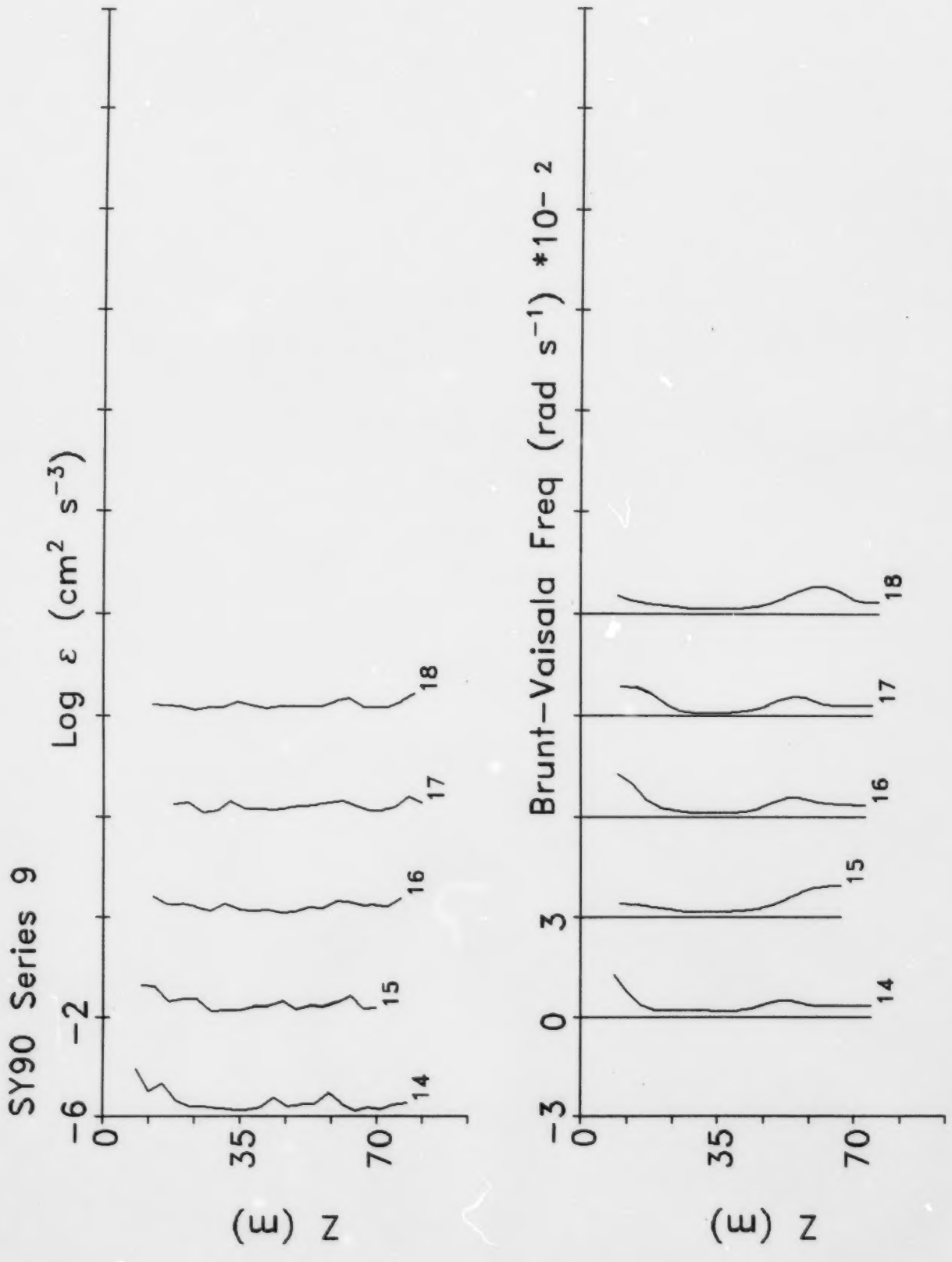
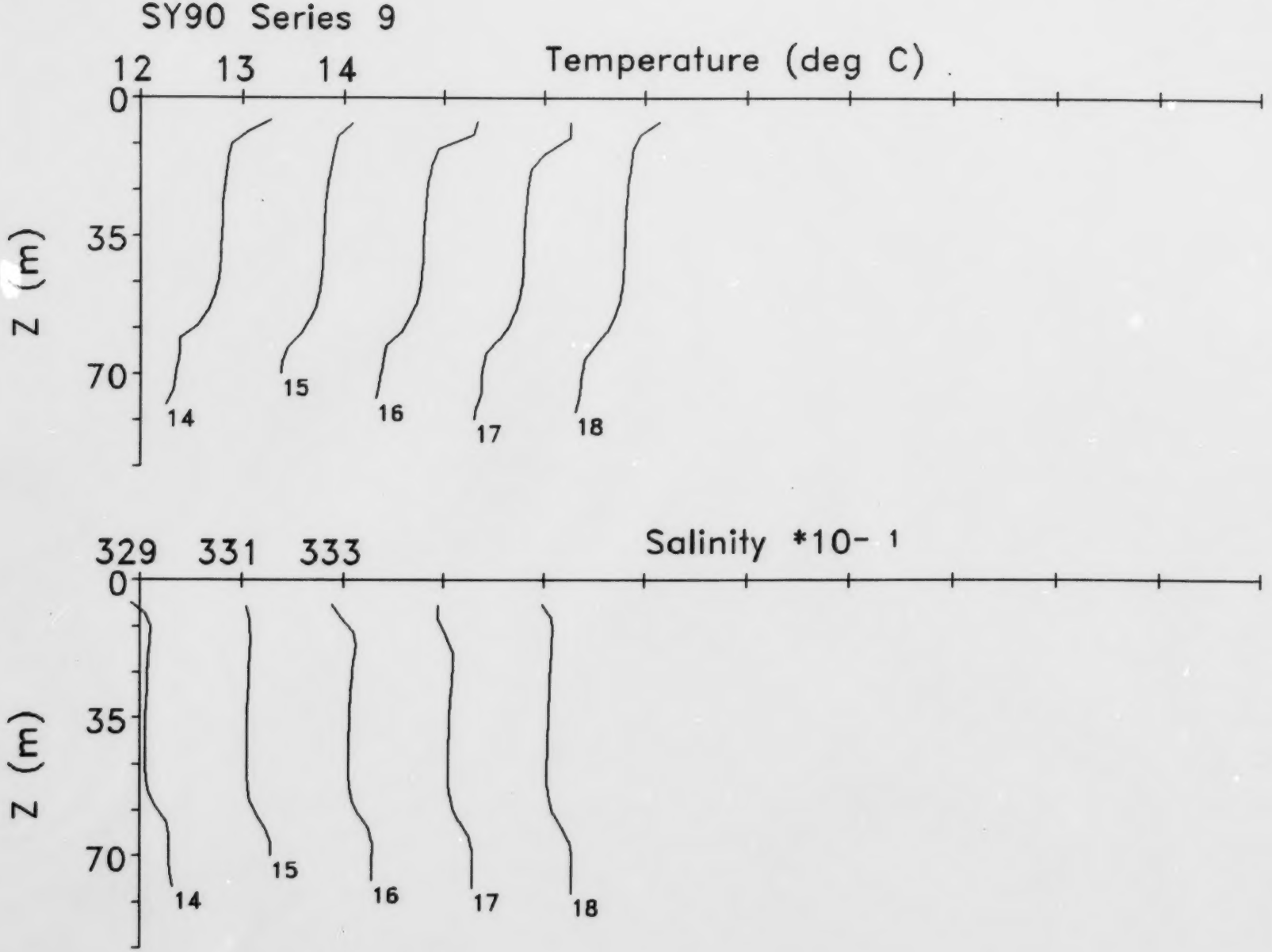
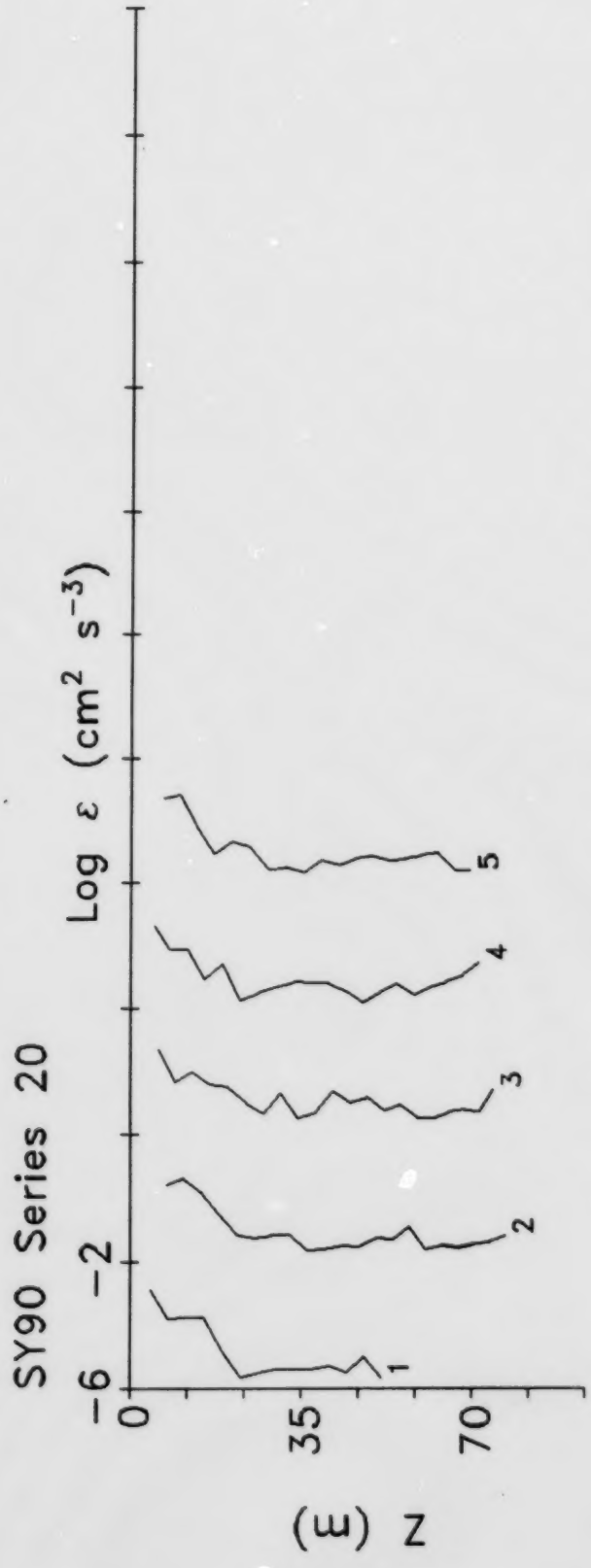
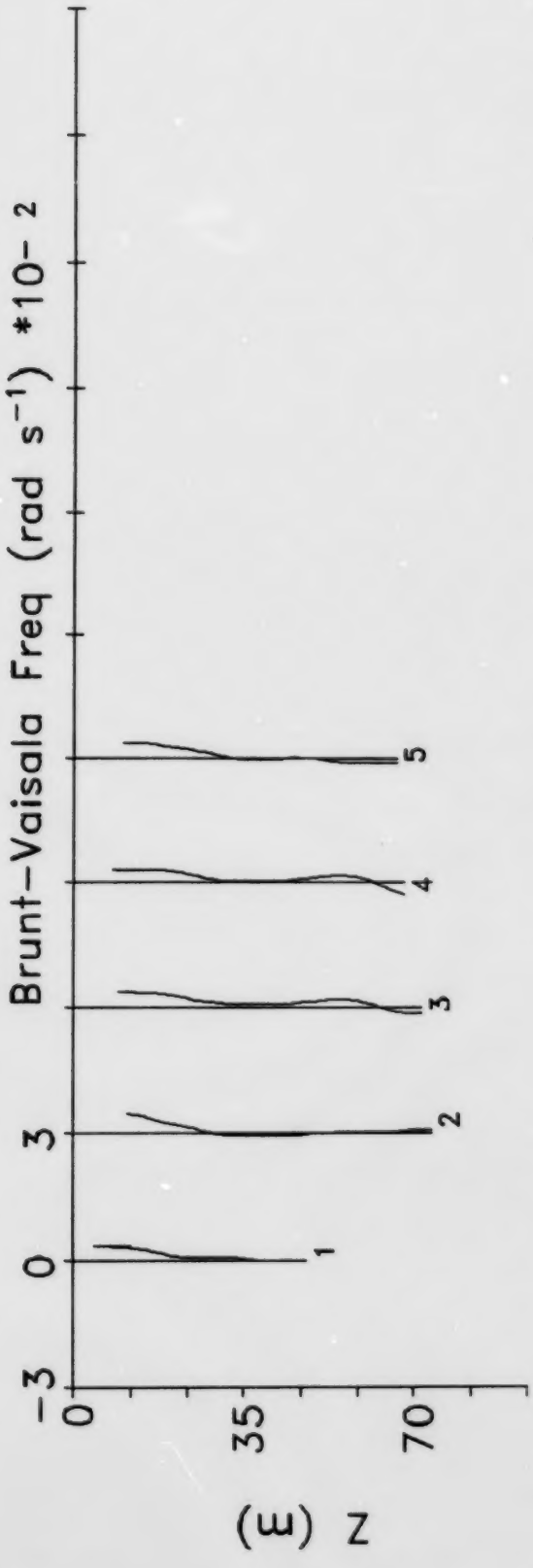
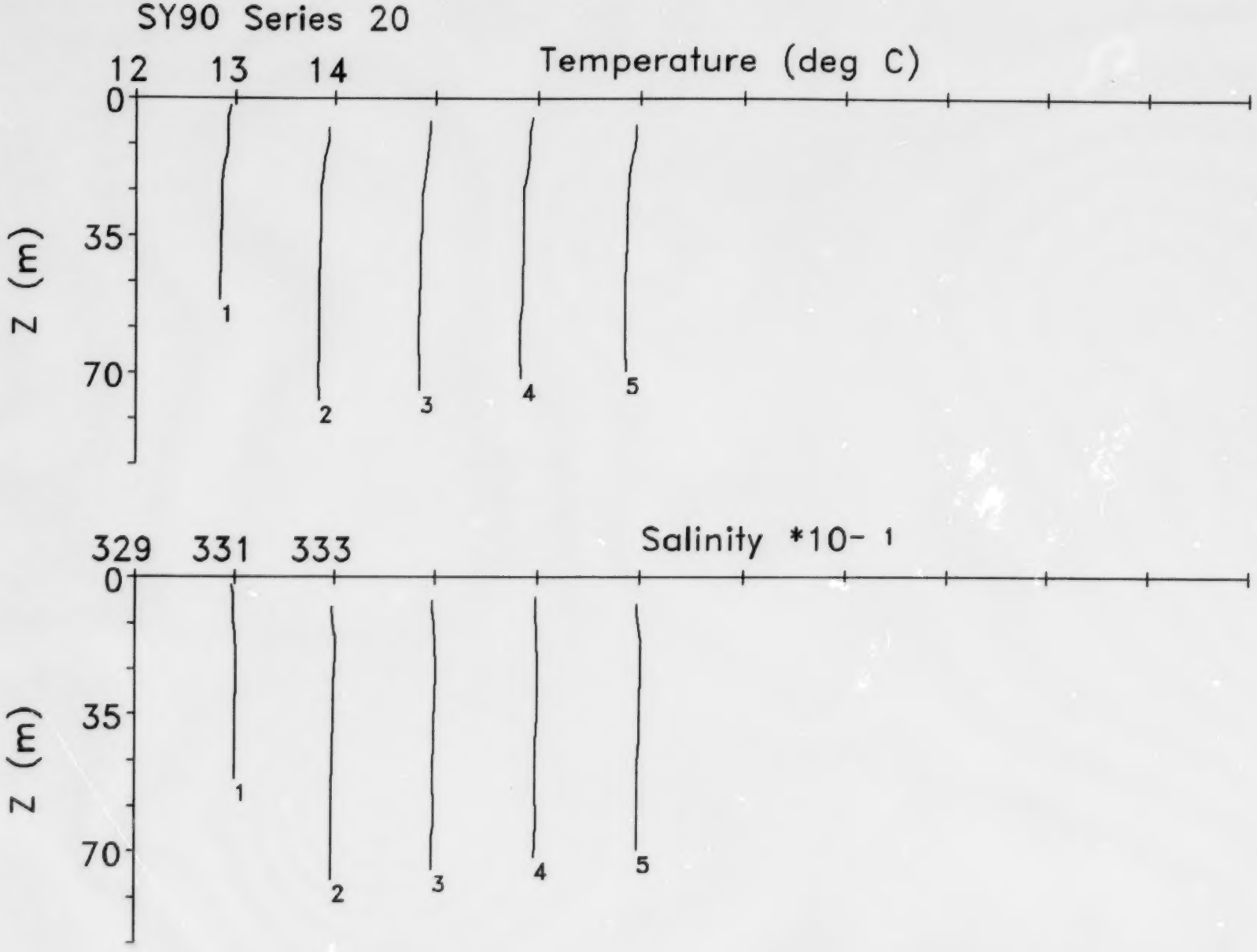

SY90 Series 9
Temperature (deg C)
12
13
14
0
35
70
Z (m)
4
5
6
7
8
9
10
11
12
13
Salinity *10- 1
329
331
333
0
35
70
Z (m)
4
5
6
7
8
9
10
11
12
13

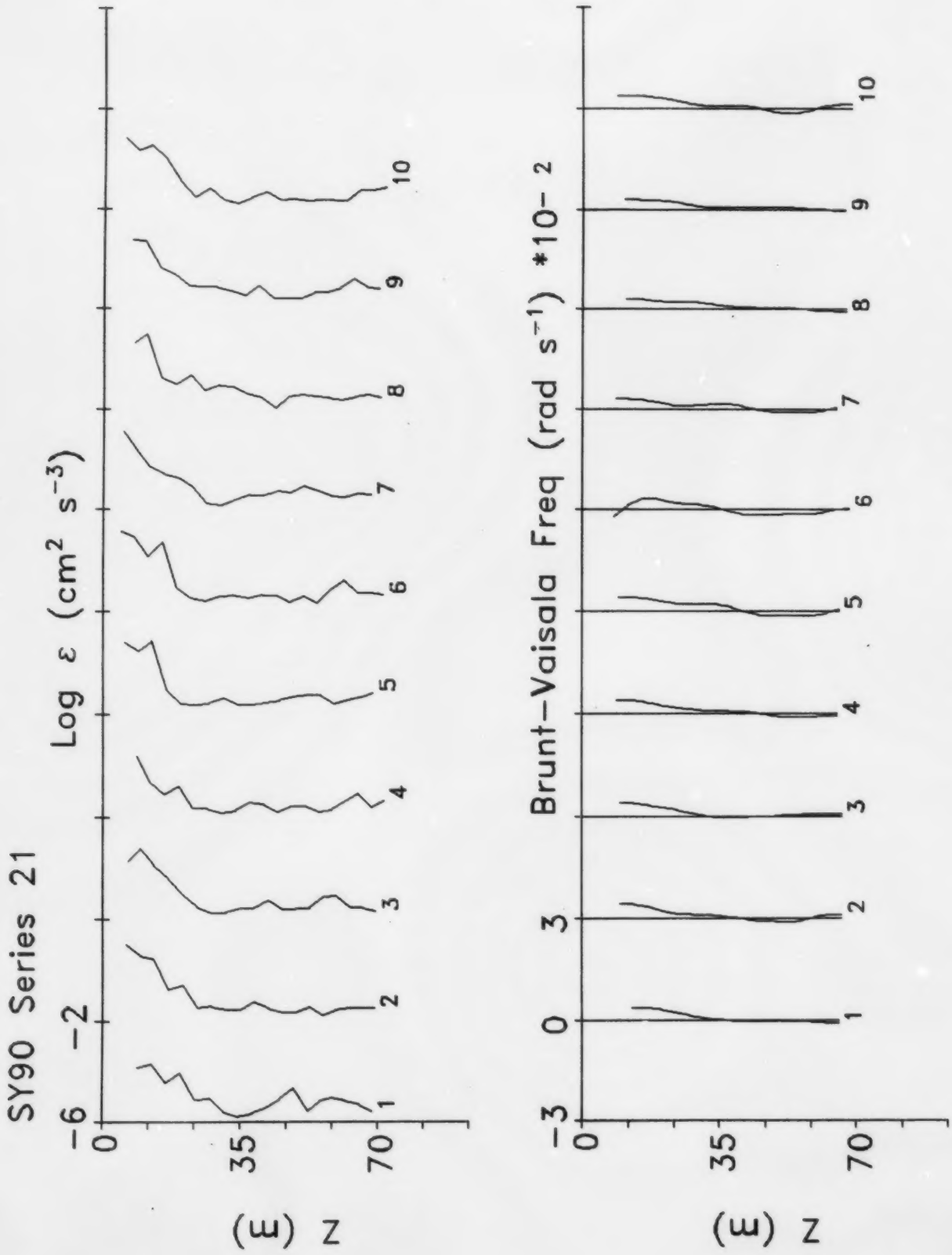

SY90 Series 9
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
14
15
16
17
18
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
14
15
16
17
18

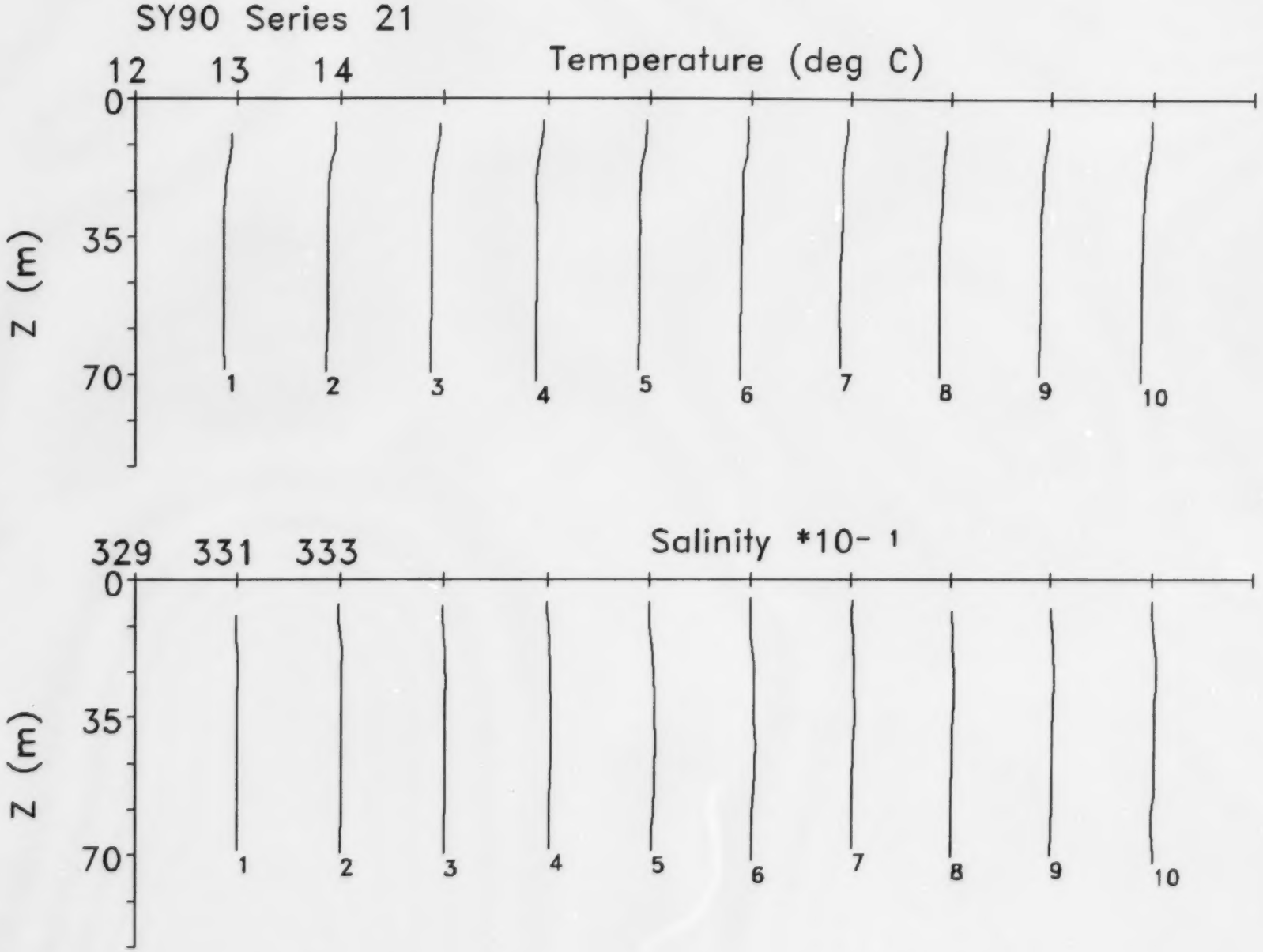

SY90 Series 9
12
13
14
Temperature (deg C)
0
35
70
Z (m)
14
15
16
17
18
329
331
333
Salinity *10- 1
0
35
70
Z (m)
14
15
16
17
18

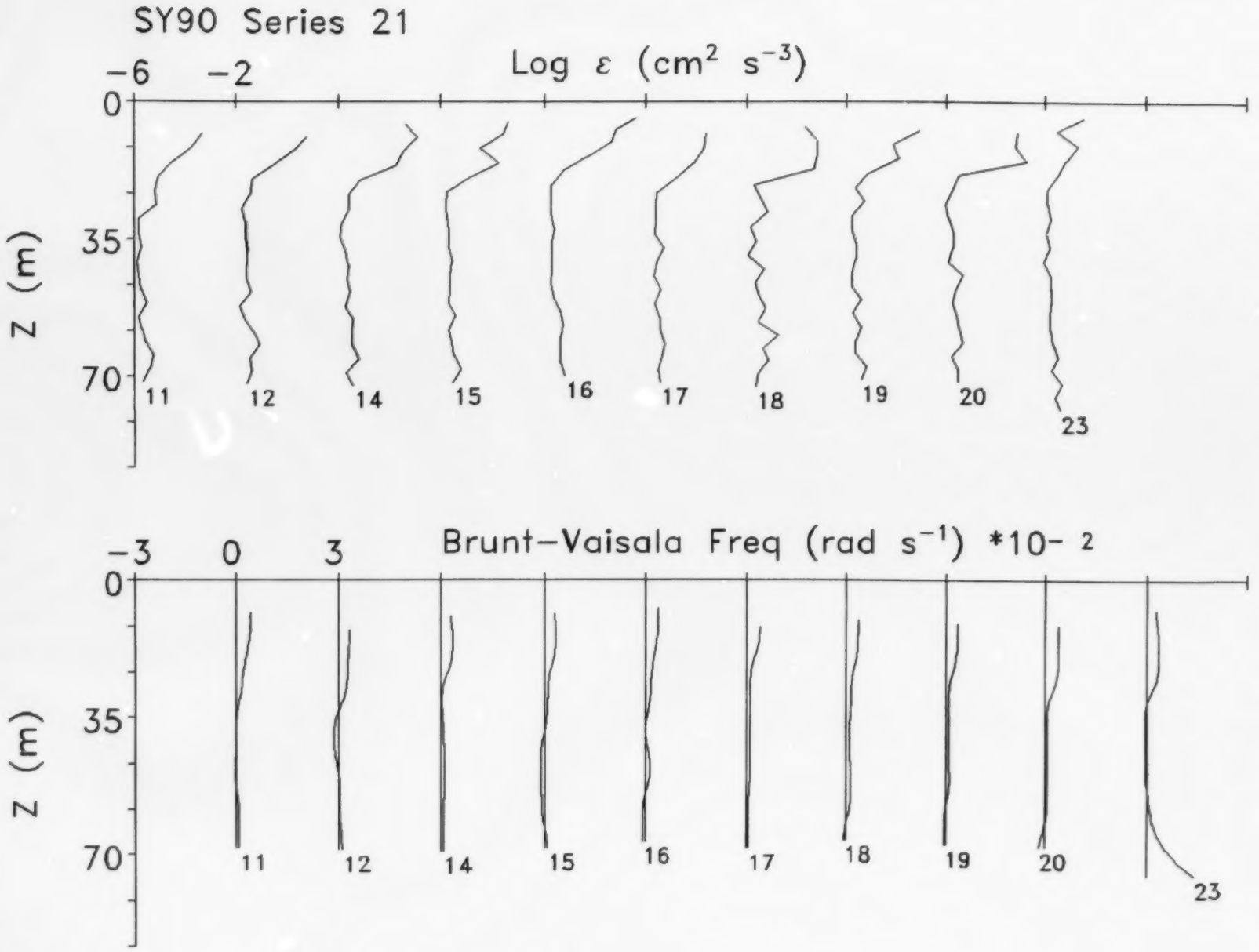

SY90 Series 20
Log ε (cm² s⁻³)
-6
-2
0
35
70
Z (m)
1
2
3
4
5

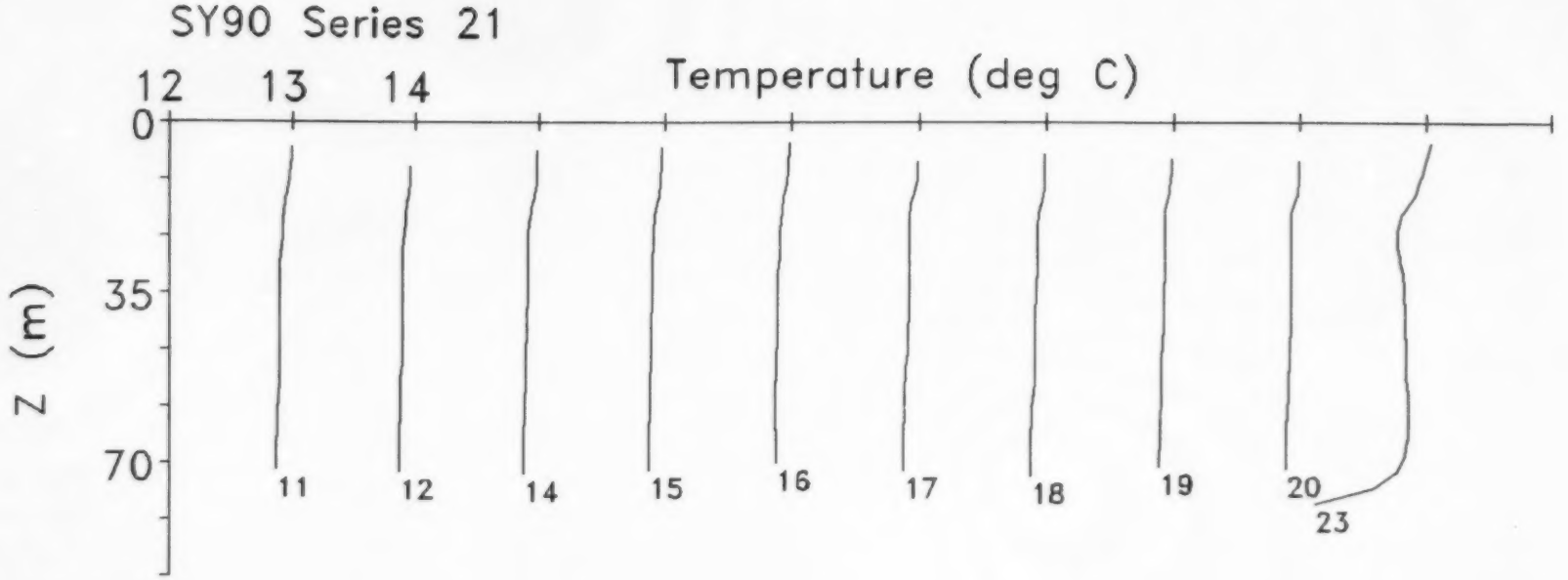

Brunt-Vaisala Freq (rad s⁻¹) *10- 2
-3
0
3
0
35
70
Z (m)
1
2
3
4
5

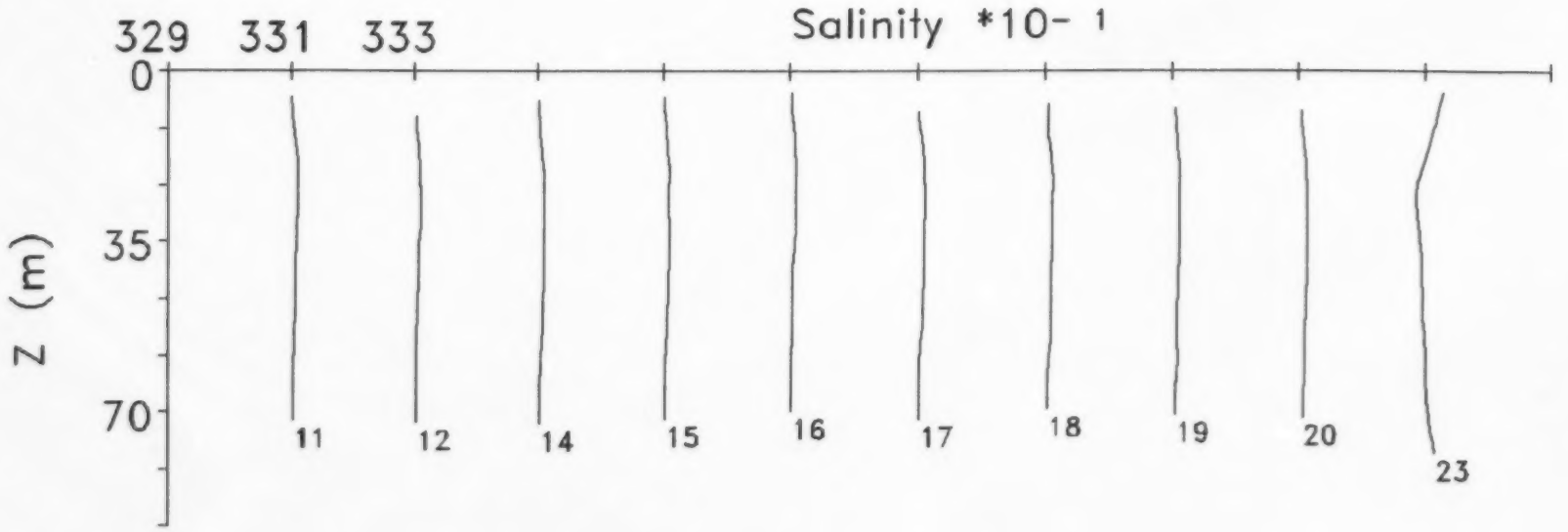

SY90 Series 20
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
4
5
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2
3
4
5

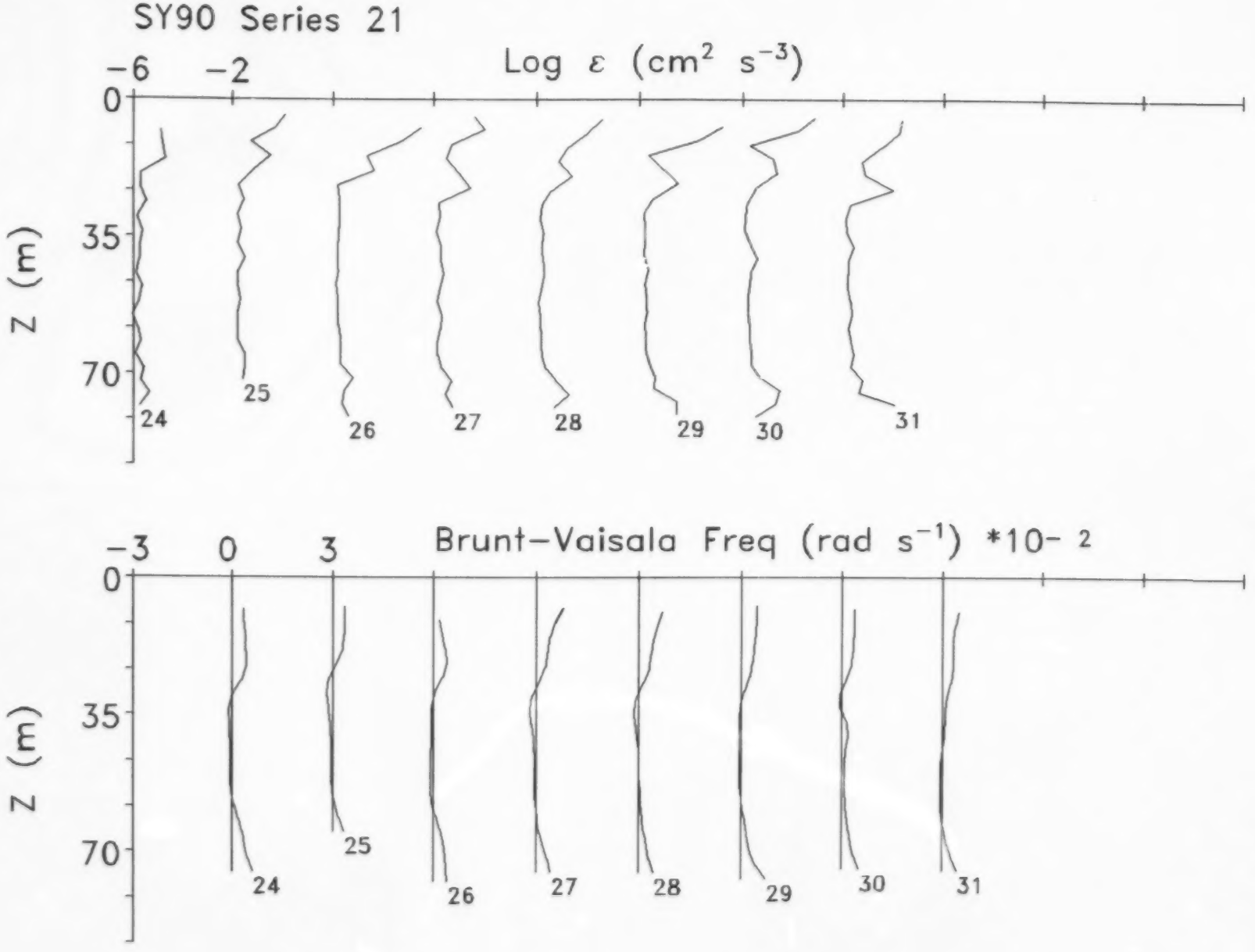

SY90 Series 21
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)

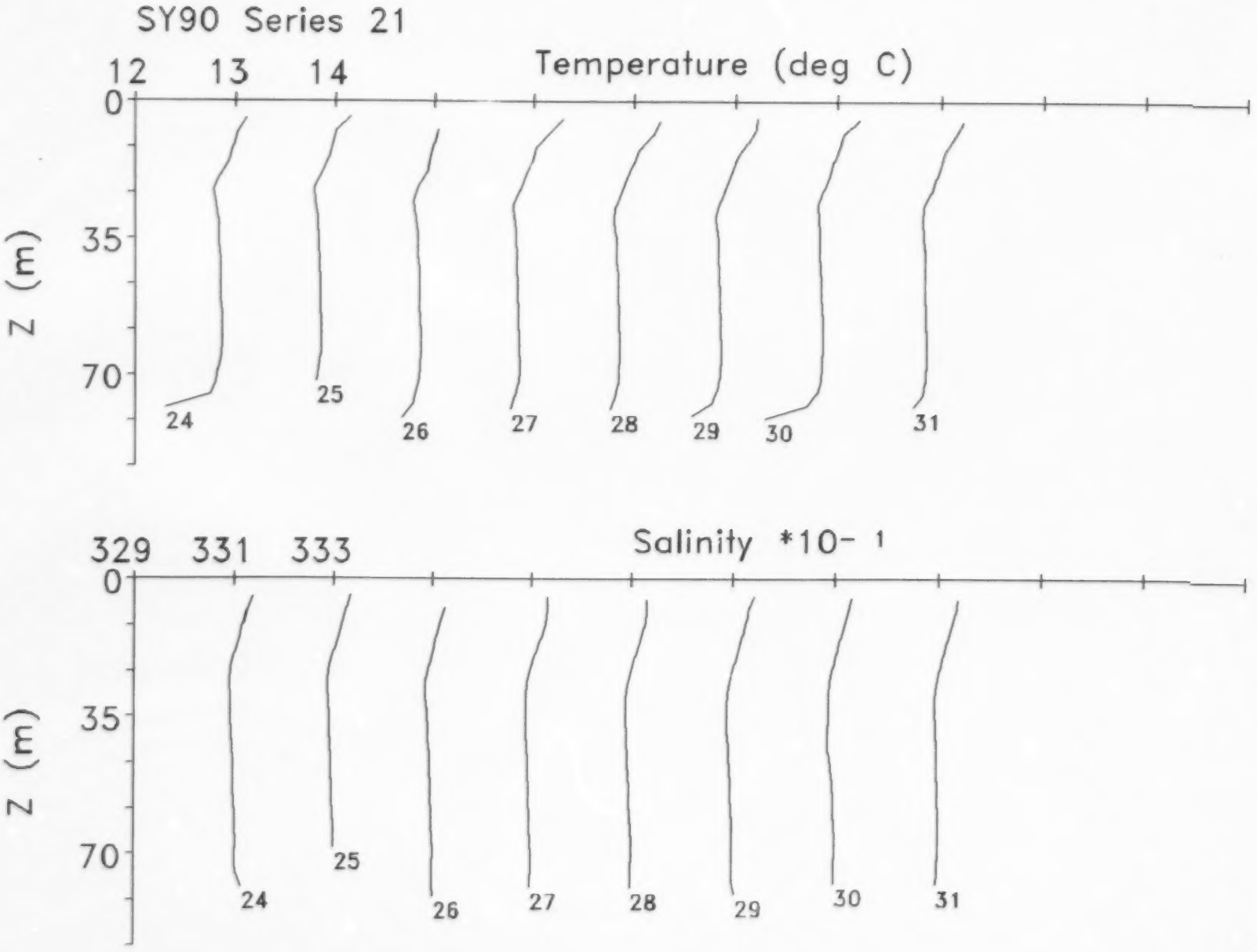

SY90 Series 21
Temperature (deg C)
12
13
14
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Salinity *10- 1
329
331
333
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10

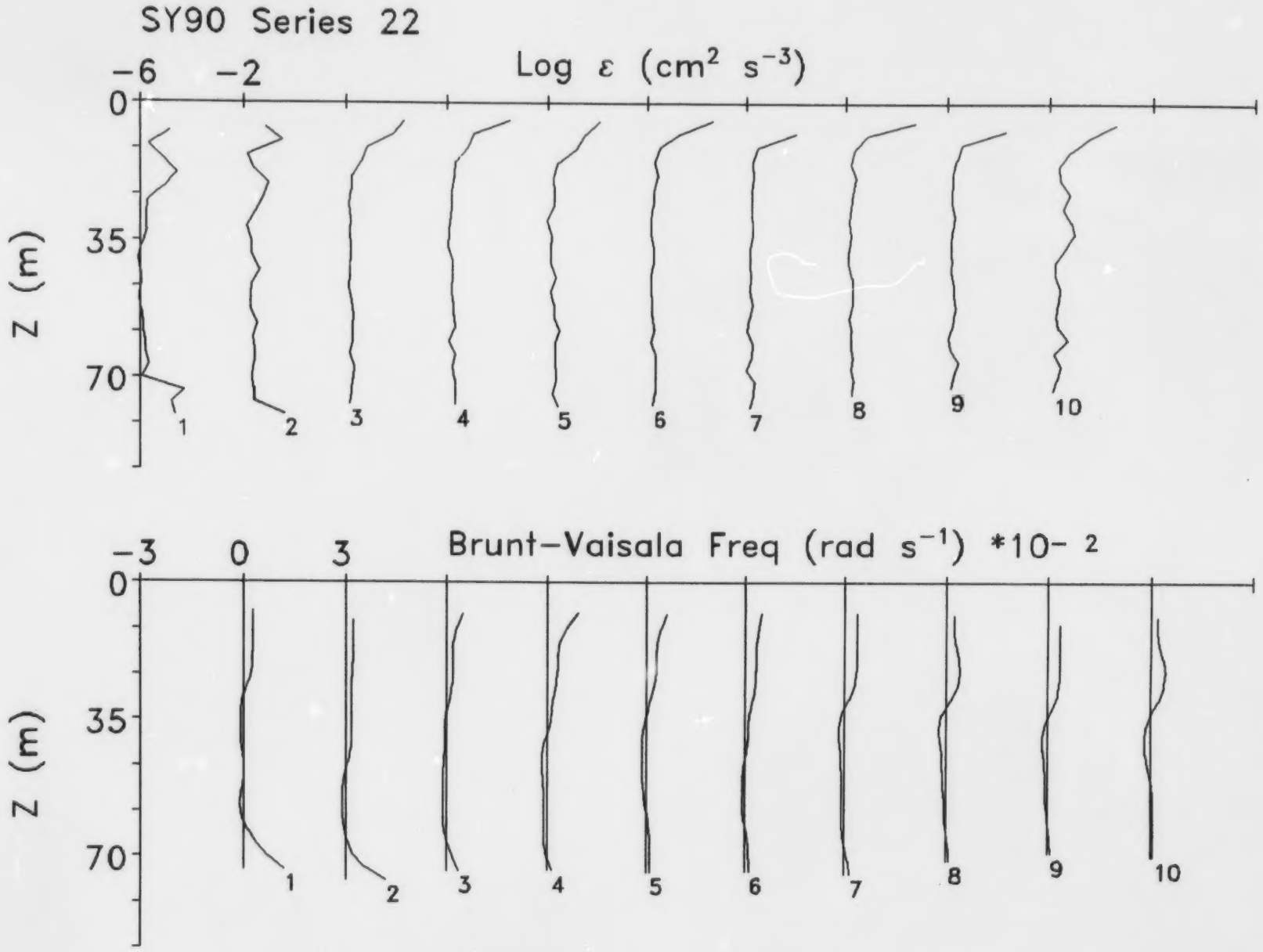

SY90 Series 21
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
11
12
14
15
16
17
18
19
20
23
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
35
70
Z (m)
11
12
14
15
16
17
18
19
20
23

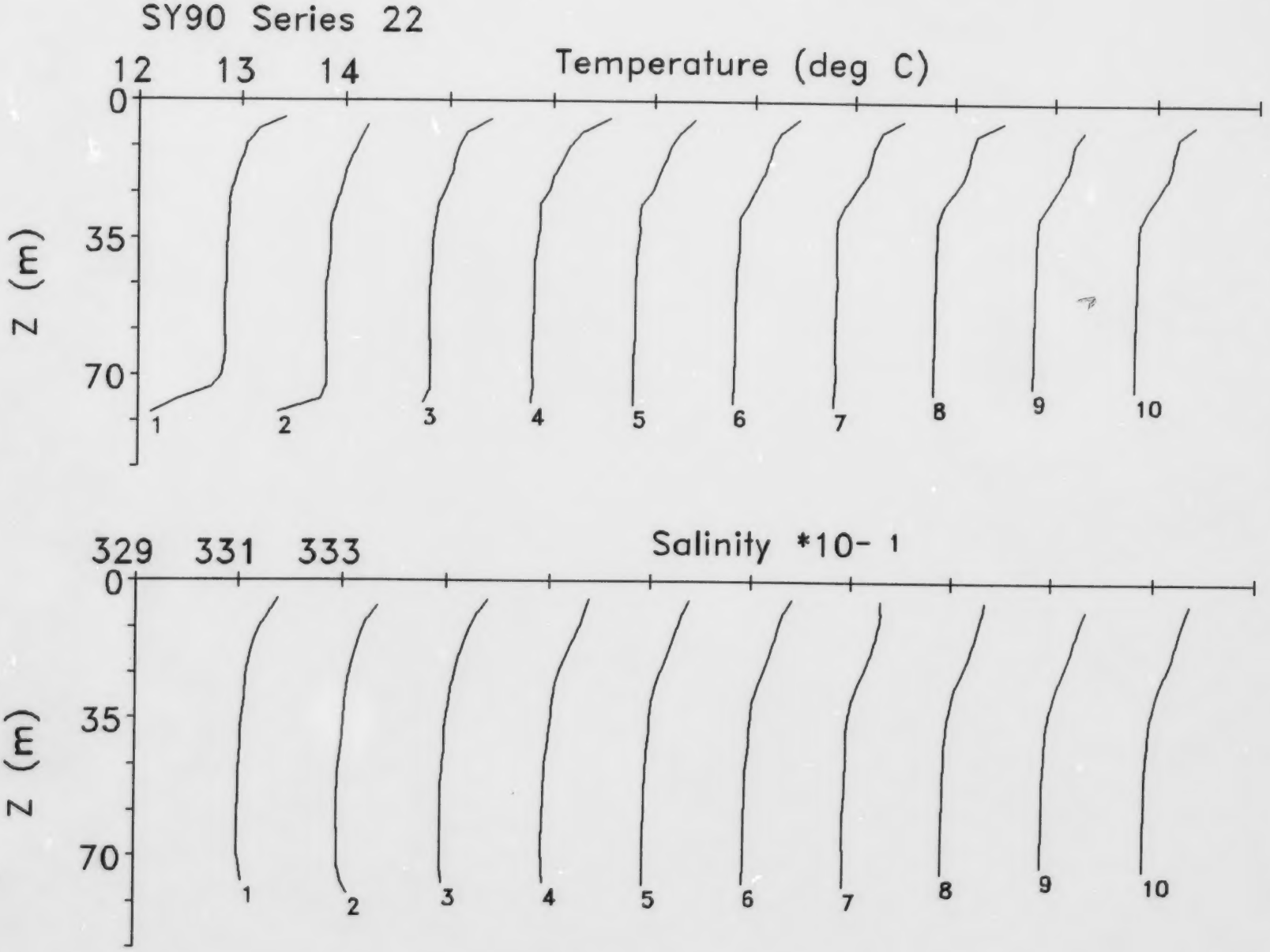

SY90 Series 21
Temperature (deg C)
12
13
14
0
35
70
Z (m)
11
12
14
15
16
17
18
19
20
23

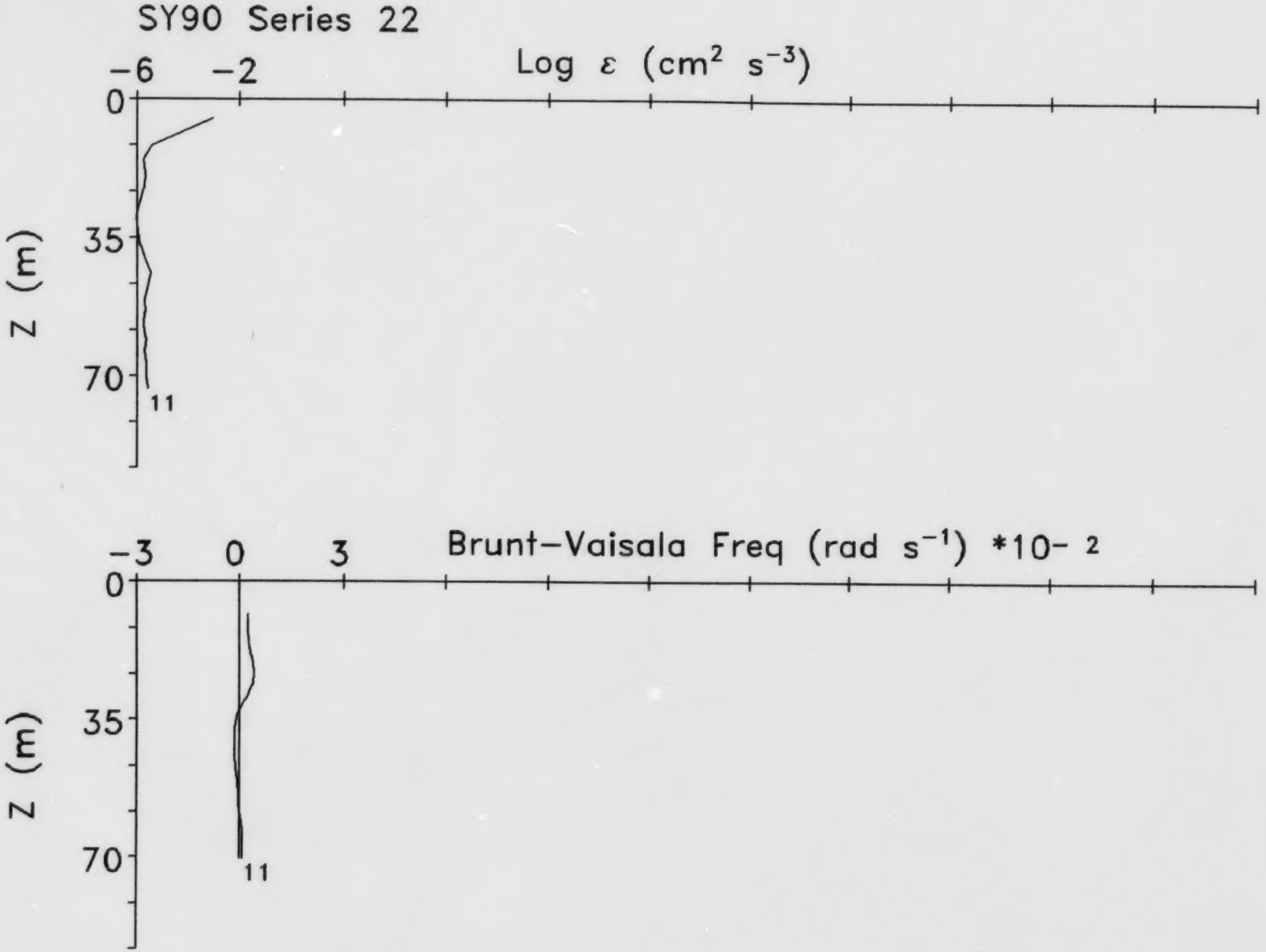

Salinity *10- 1
329
331
333
0
35
70
Z (m)
11
12
14
15
16
17
18
19
20
23

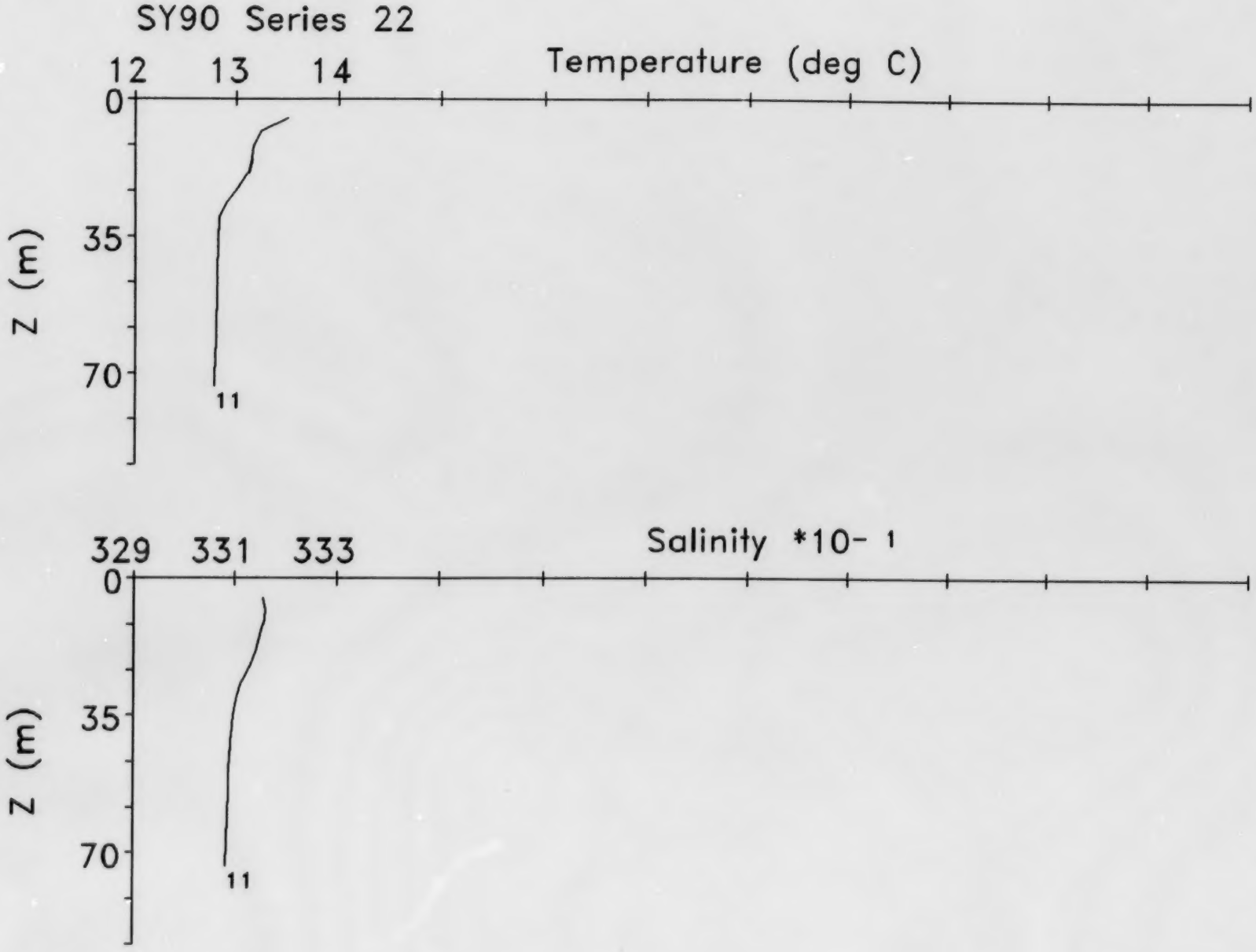

SY90 Series 21
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
24
25
26
27
28
29
30
31
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
24
25
26
27
28
29
30
31

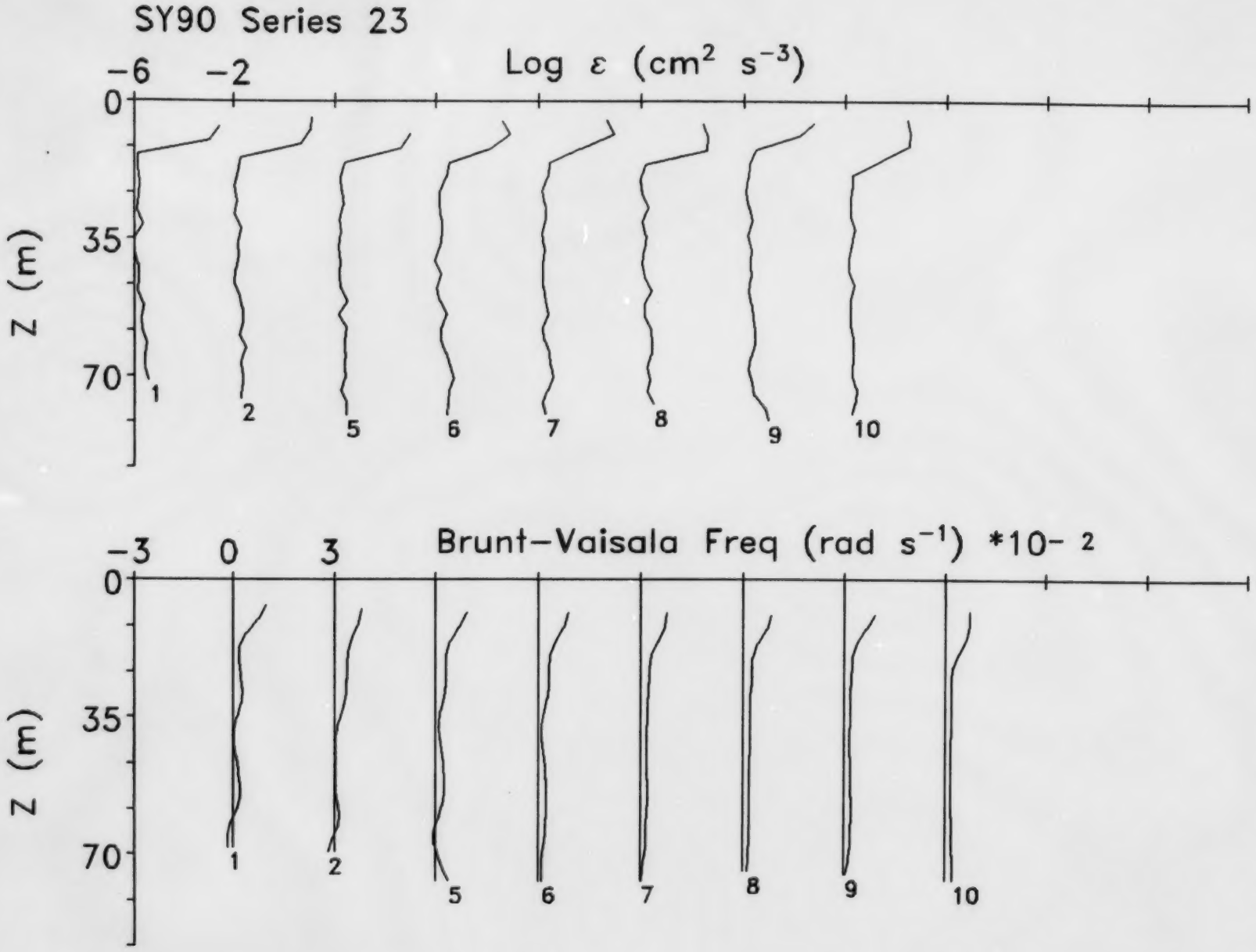

SY90 Series 21
12
13
14
Temperature (deg C)
0
35
70
Z (m)
24
25
26
27
28
29
30
31
329
331
333
Salinity *10- 1
0
35
70
Z (m)
24
25
26
27
28
29
30
31

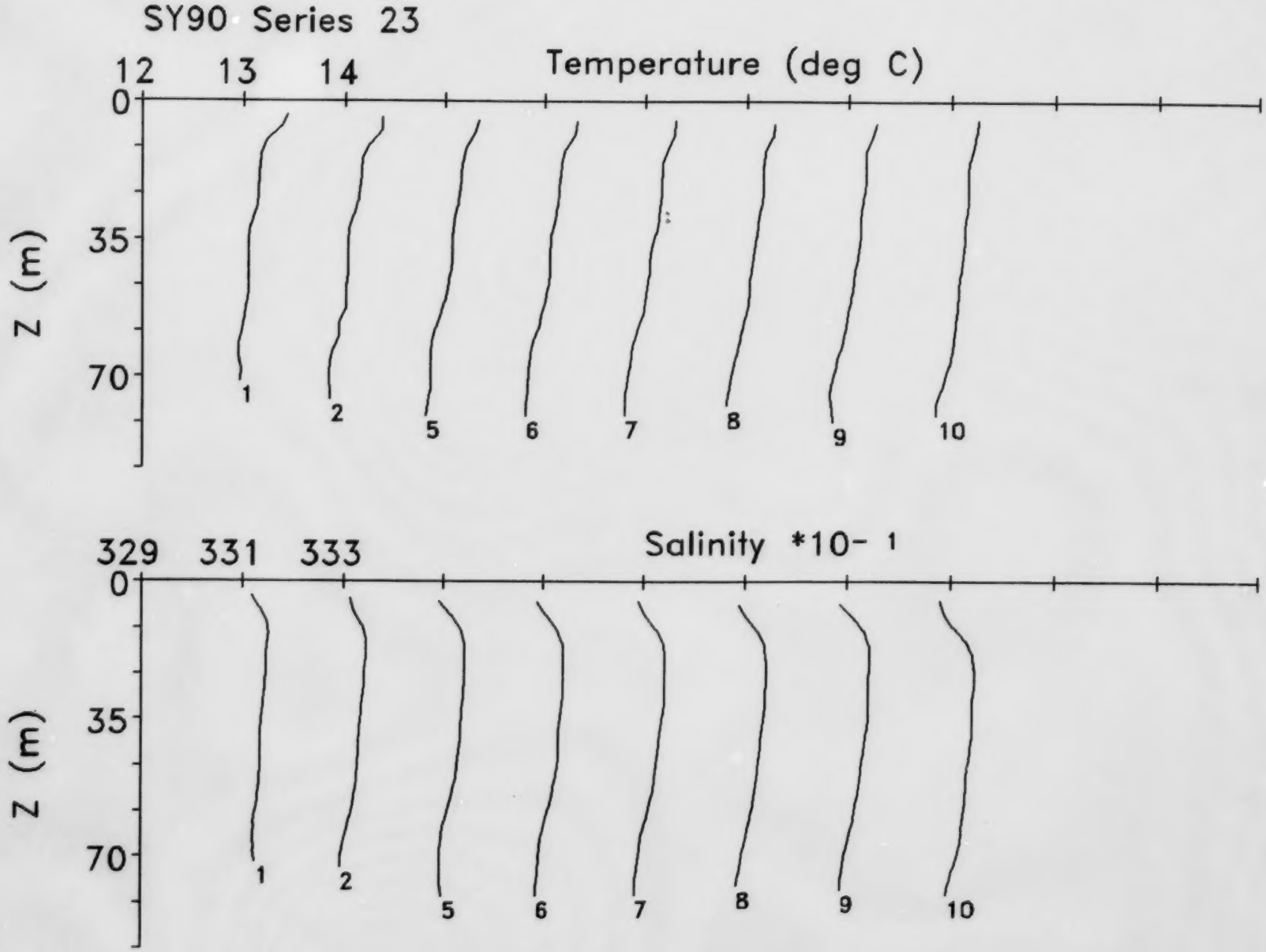

SY90 Series 22
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10

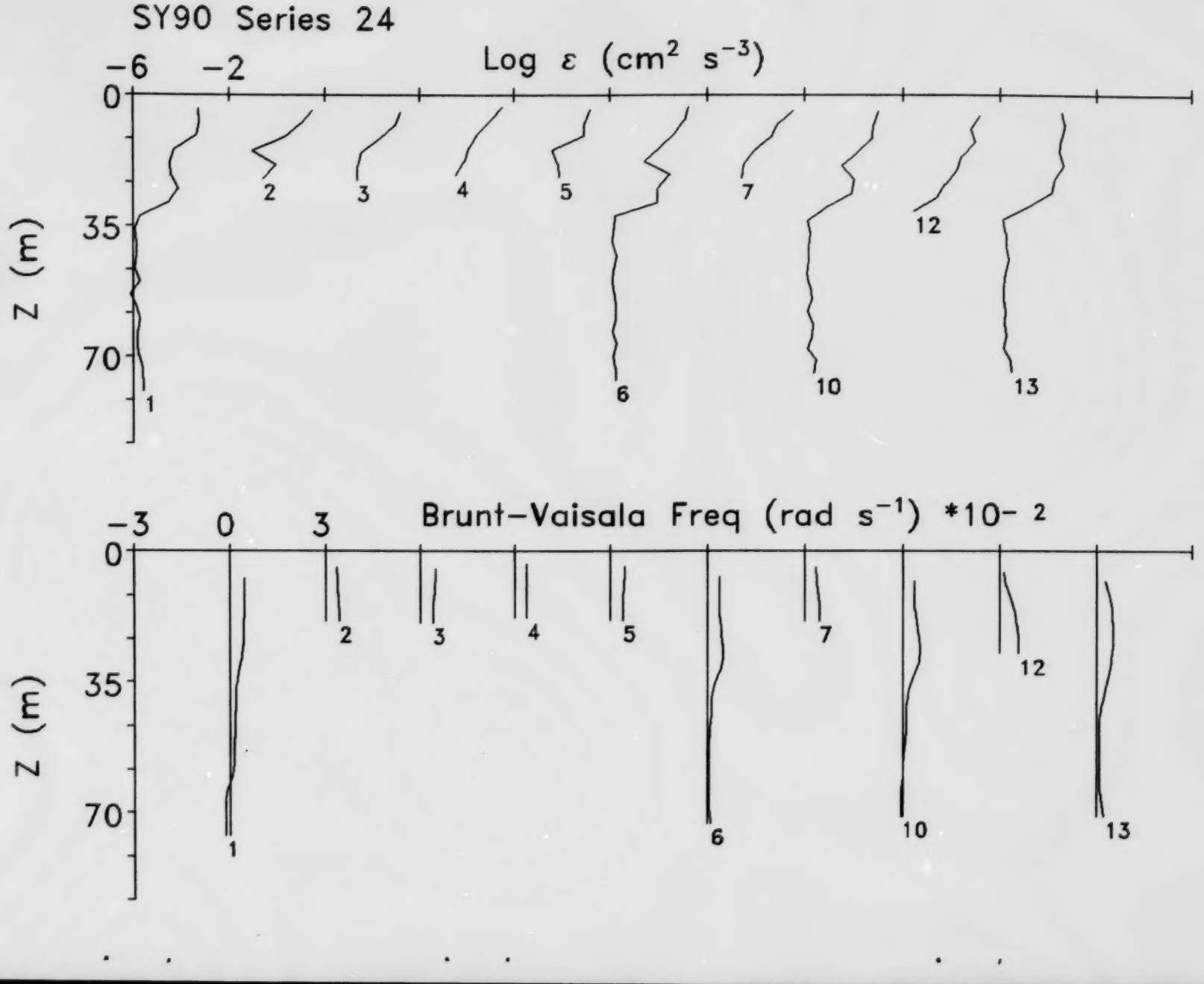

SY90 Series 22
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2
3
4
5
6
7
8
9
10

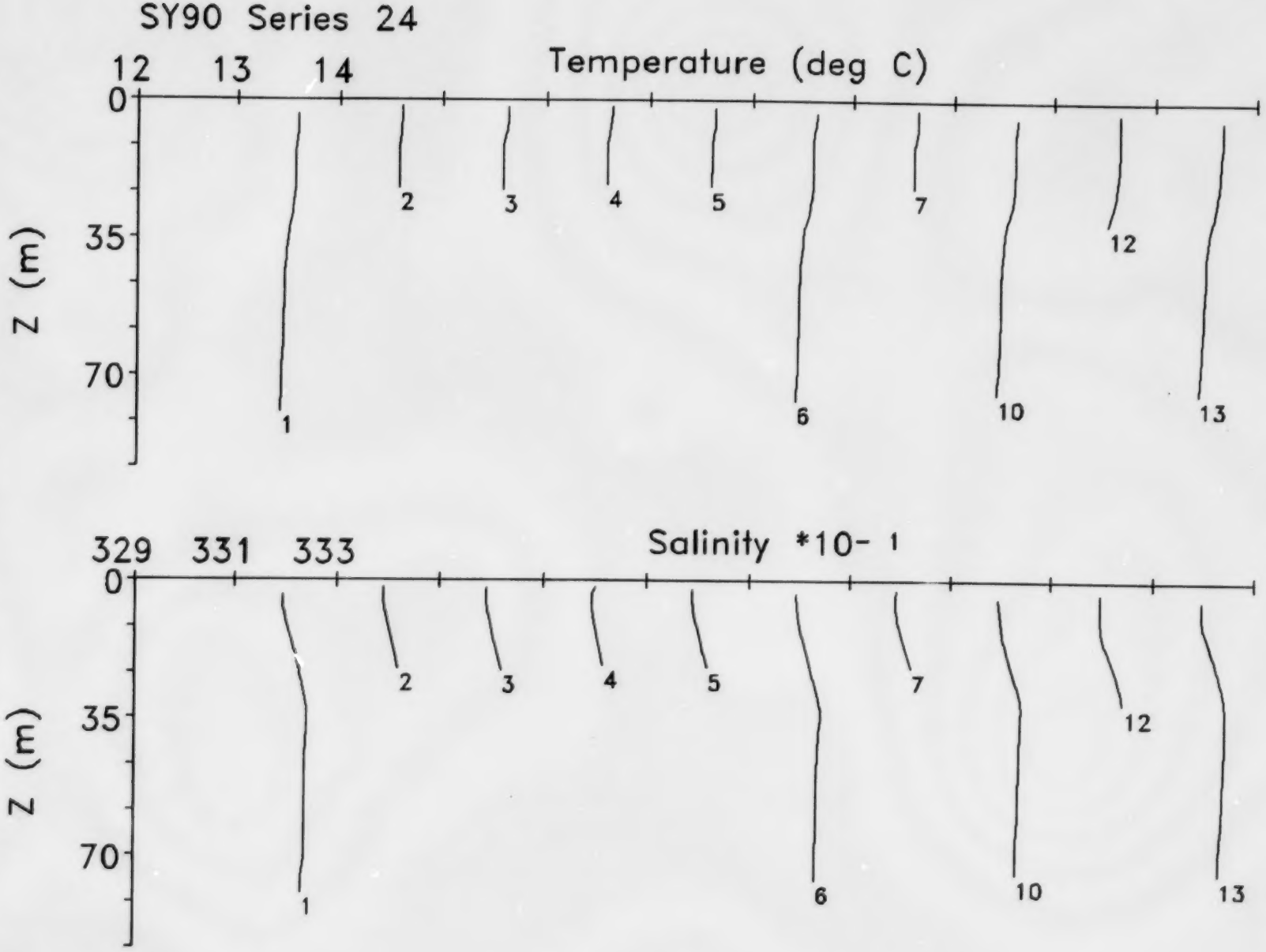

SY90 Series 22
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
11
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
11

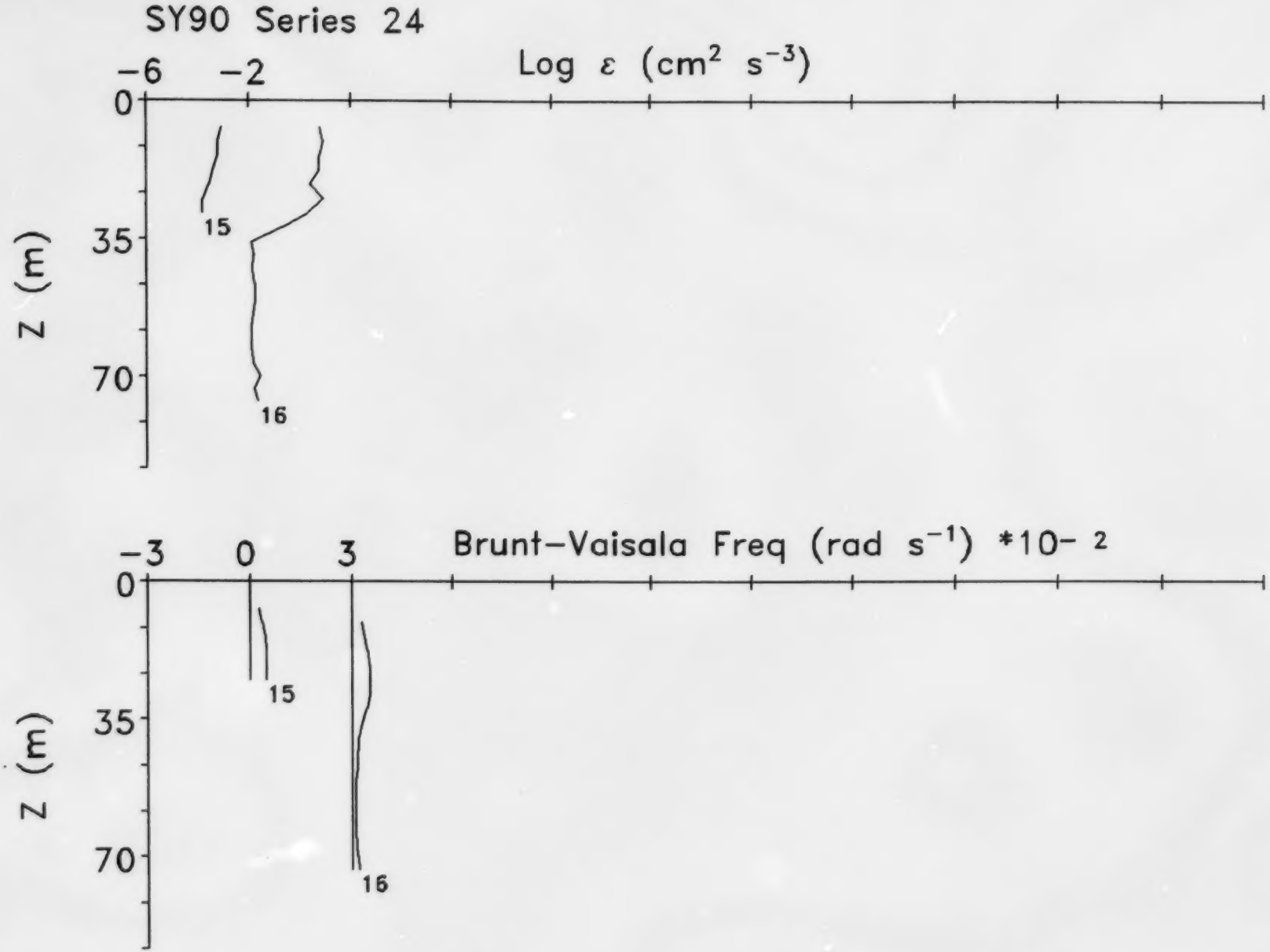

SY90 Series 22
12
13
14
Temperature (deg C)
0
35
70
Z (m)
11
329
331
333
Salinity *10- 1
0
35
70
Z (m)
11

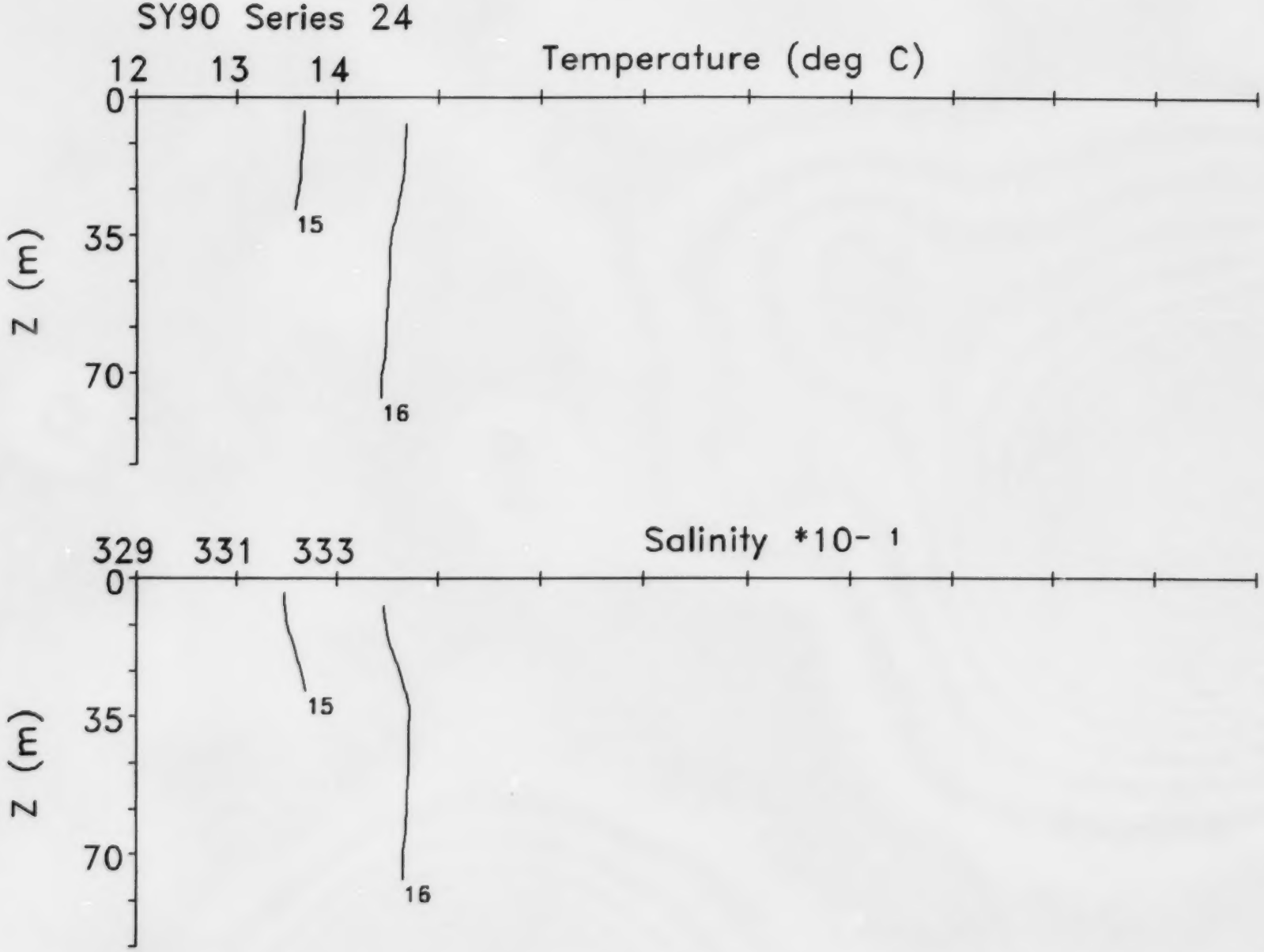

SY90 Series 23
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
5
6
7
8
9
10
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
1
2
5
6
7
8
9
10

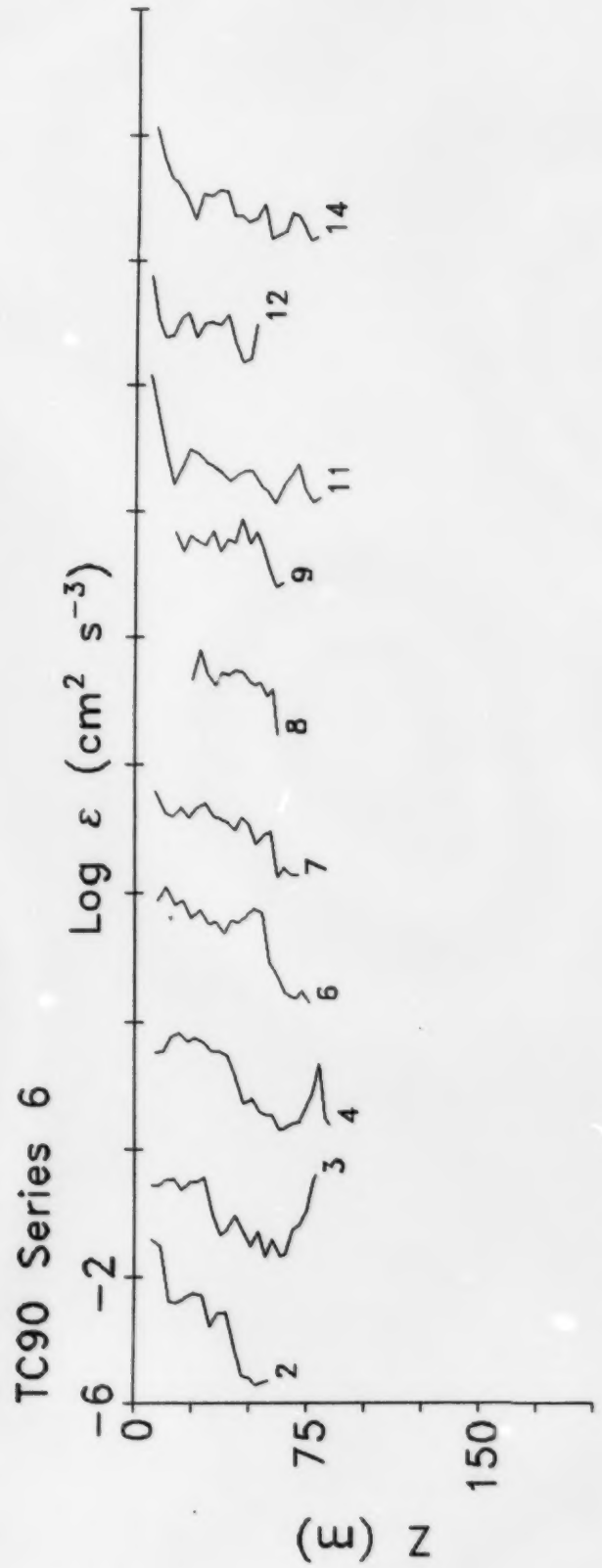

SY90 Series 23
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
5
6
7
8
9
10
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2
5
6
7
8
9
10

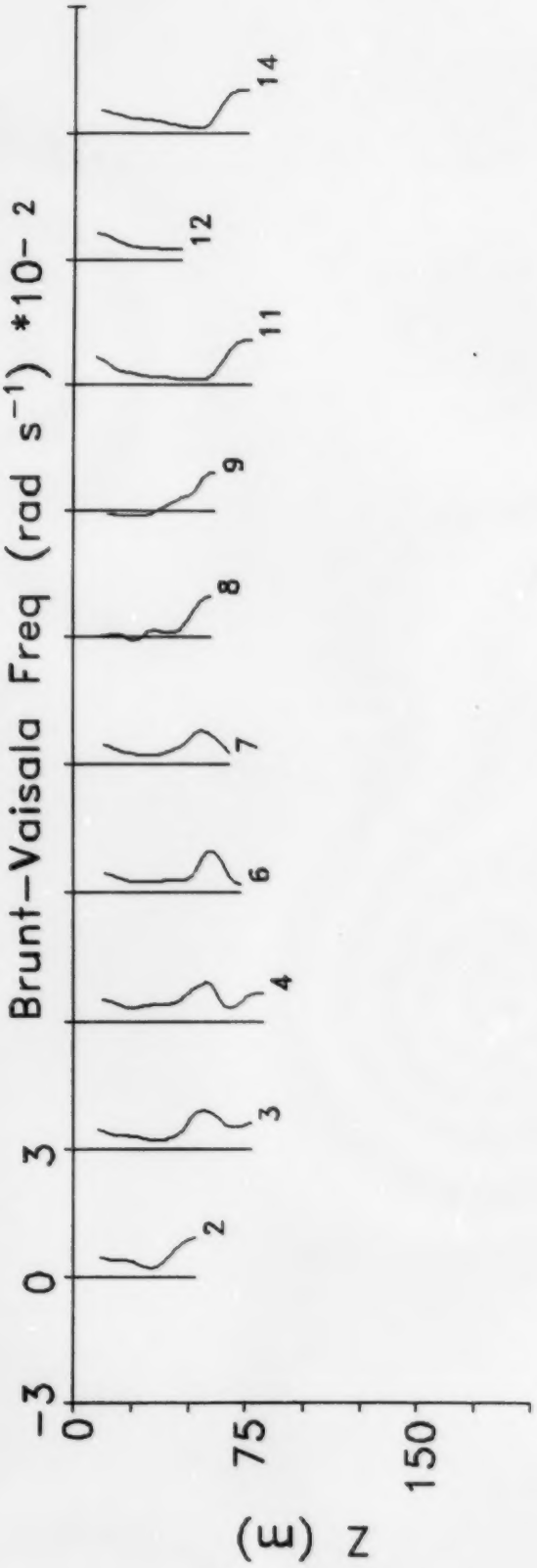

SY90 Series 24
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
1
2
3
4
5
6
7
10
12
13
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
35
70
Z (m)
1
2
3
4
5
6
7
10
12
13

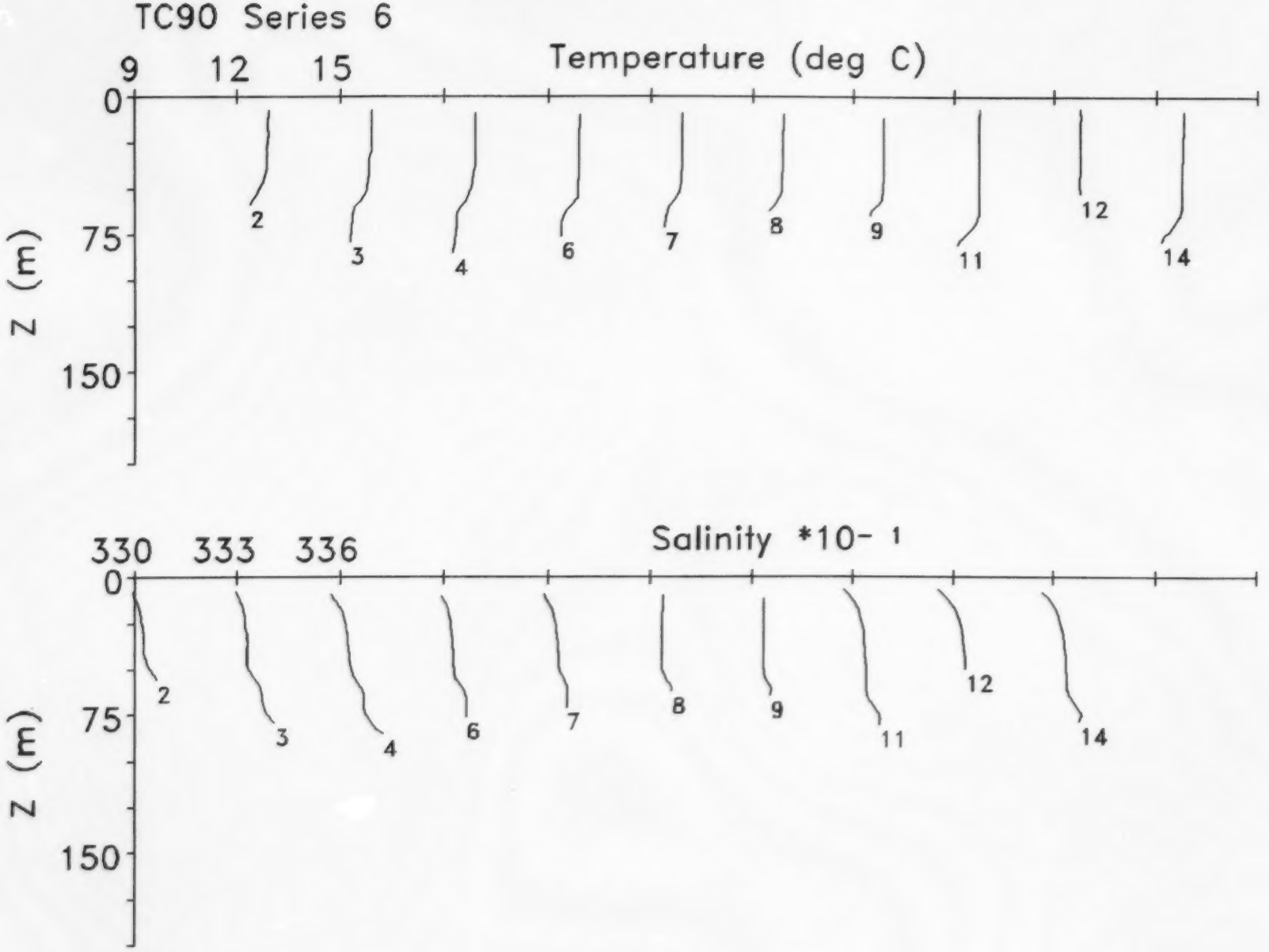

SY90 Series 24
12
13
14
Temperature (deg C)
0
35
70
Z (m)
1
2
3
4
5
6
7
10
12
13
329
331
333
Salinity *10- 1
0
35
70
Z (m)
1
2
3
4
5
6
7
10
12
13

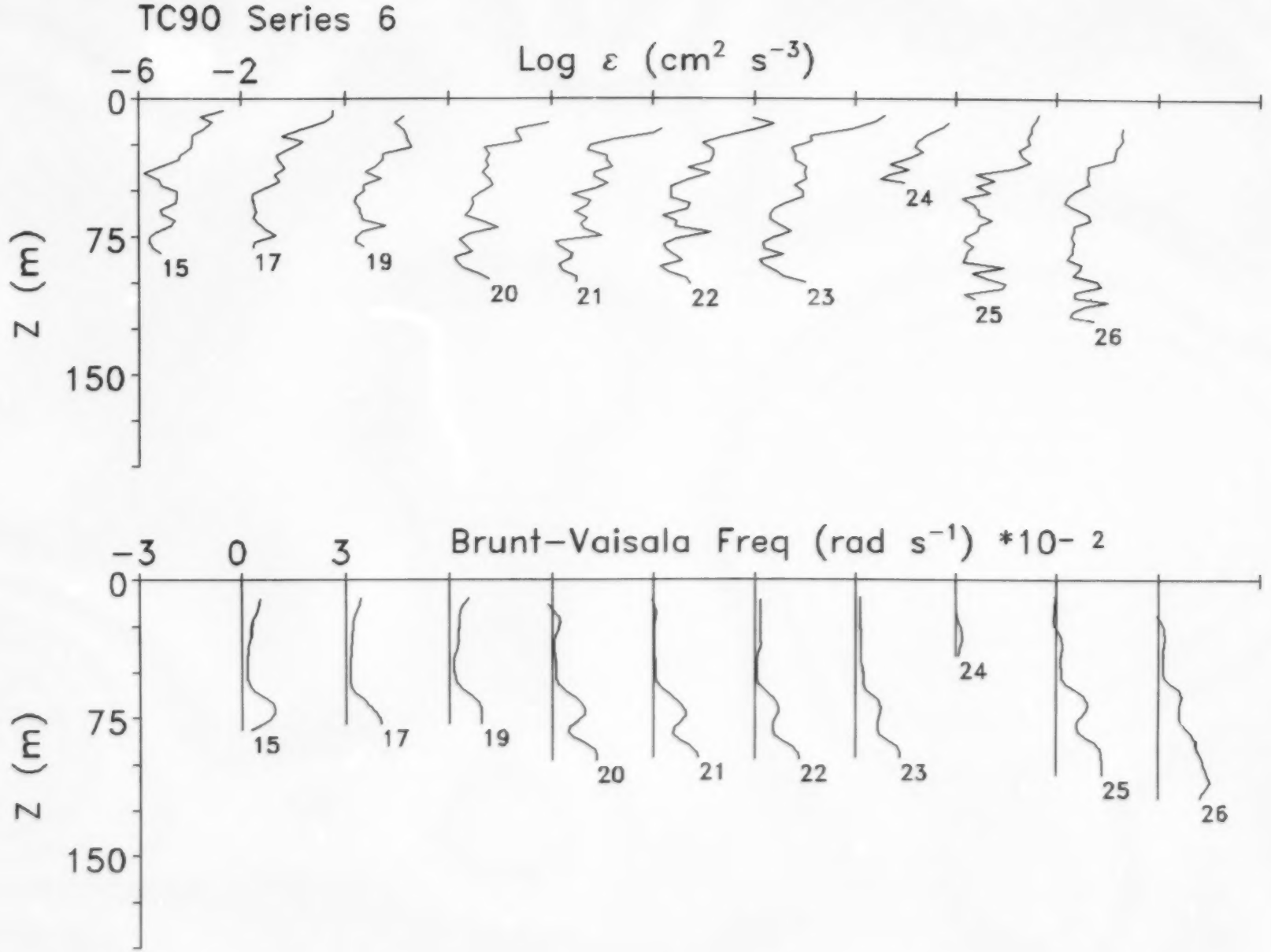

SY90 Series 24
Log ε (cm² s⁻³)
−6
−2
0
35
70
Z (m)
15
16
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
35
70
Z (m)
15
16

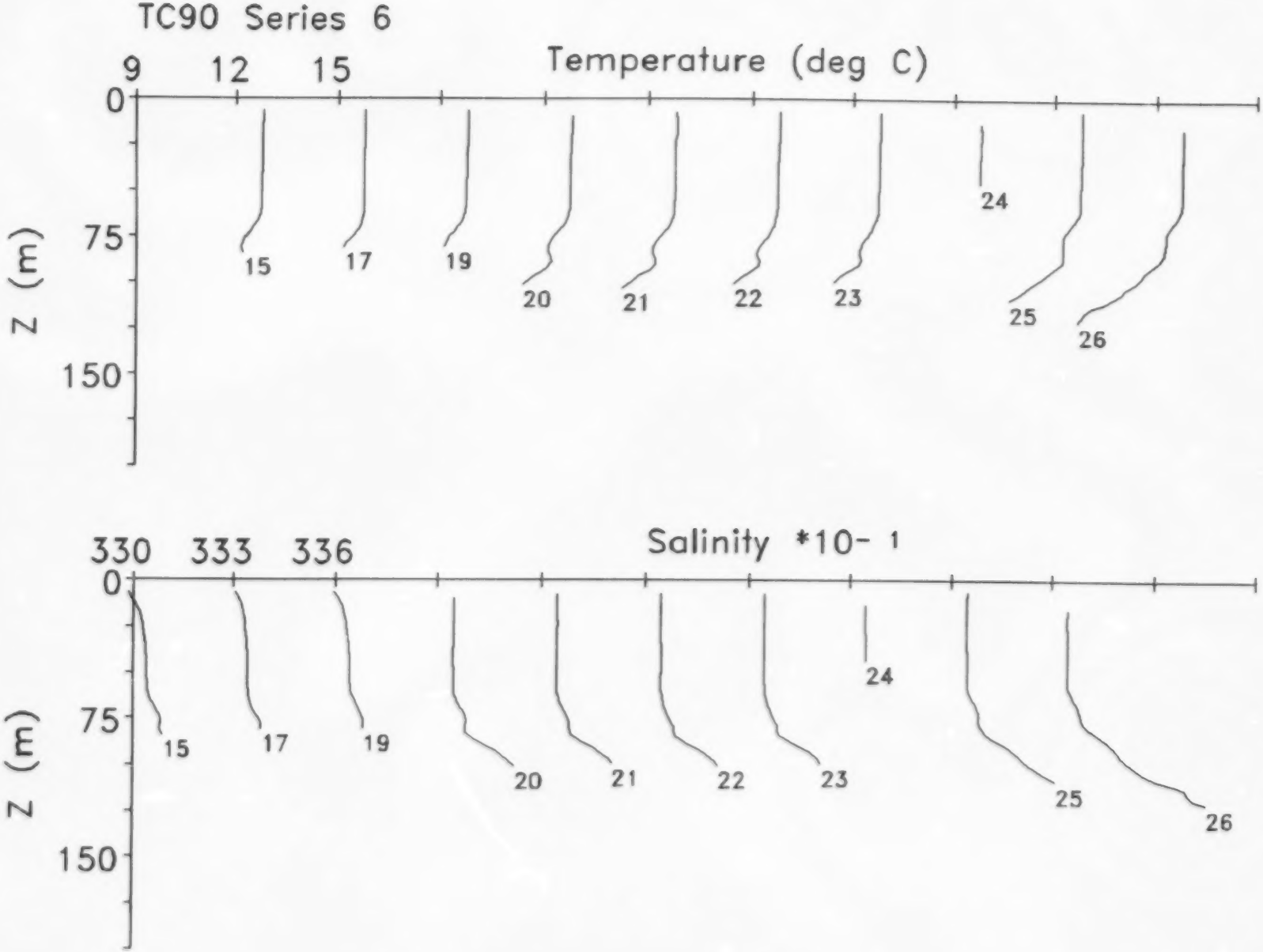

SY90 Series 24
12
13
14
Temperature (deg C)
0
35
70
Z (m)
15
16
329
331
333
Salinity *10- 1
0
35
70
Z (m)
15
16

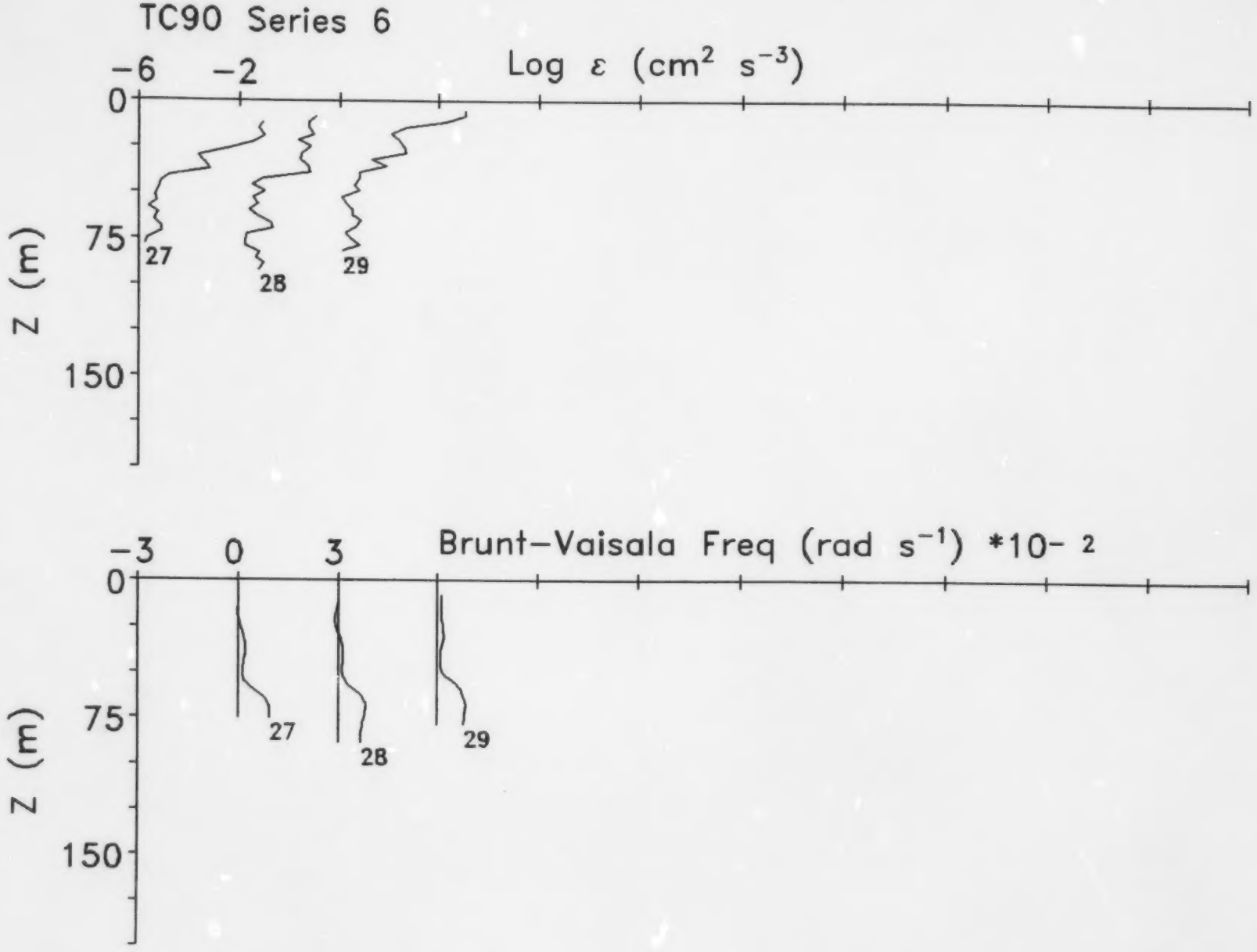

TC90 Series 6
Log ε (cm² s⁻³)
−6
−2
2
3
4
6
7
8
9
11
12
14
0
75
150
Z (m)

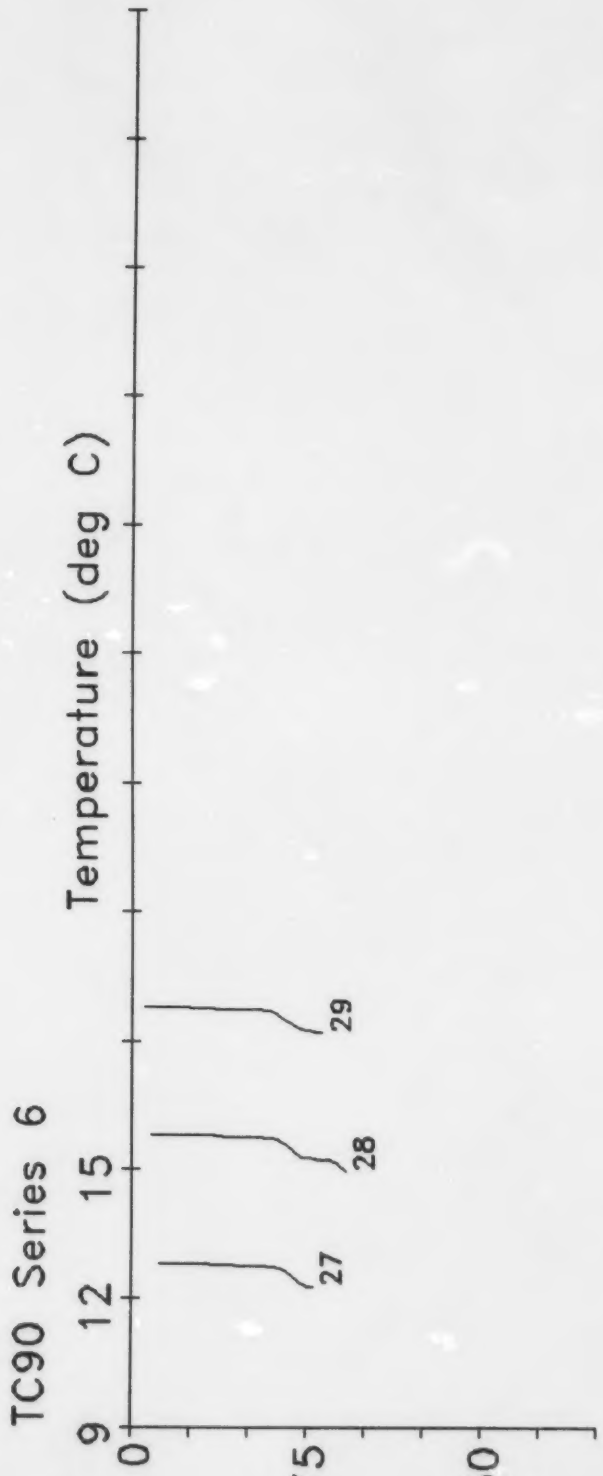

Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
2
3
4
6
7
8
9
11
12
14
0
75
150
Z (m)

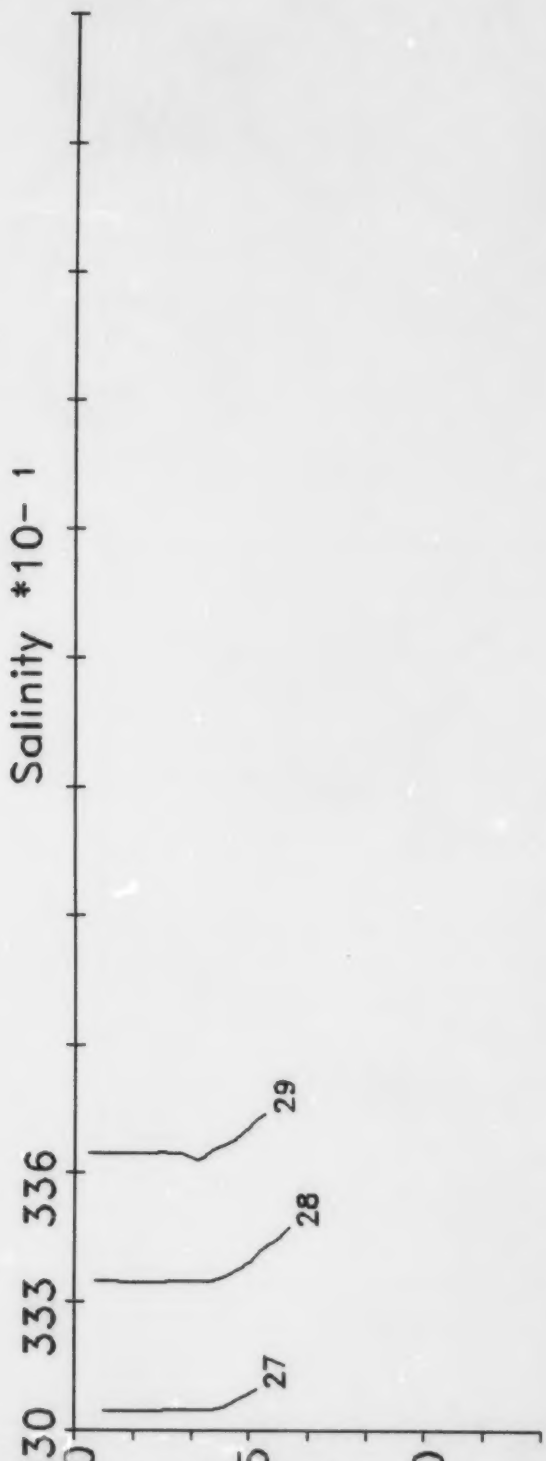

TC90 Series 6
Temperature (deg C)
9
12
15
0
75
150
Z (m)
2
3
4
6
7
8
9
11
12
14
Salinity *10- 1
330
333
336
0
75
150
Z (m)
2
3
4
6
7
8
9
11
12
14

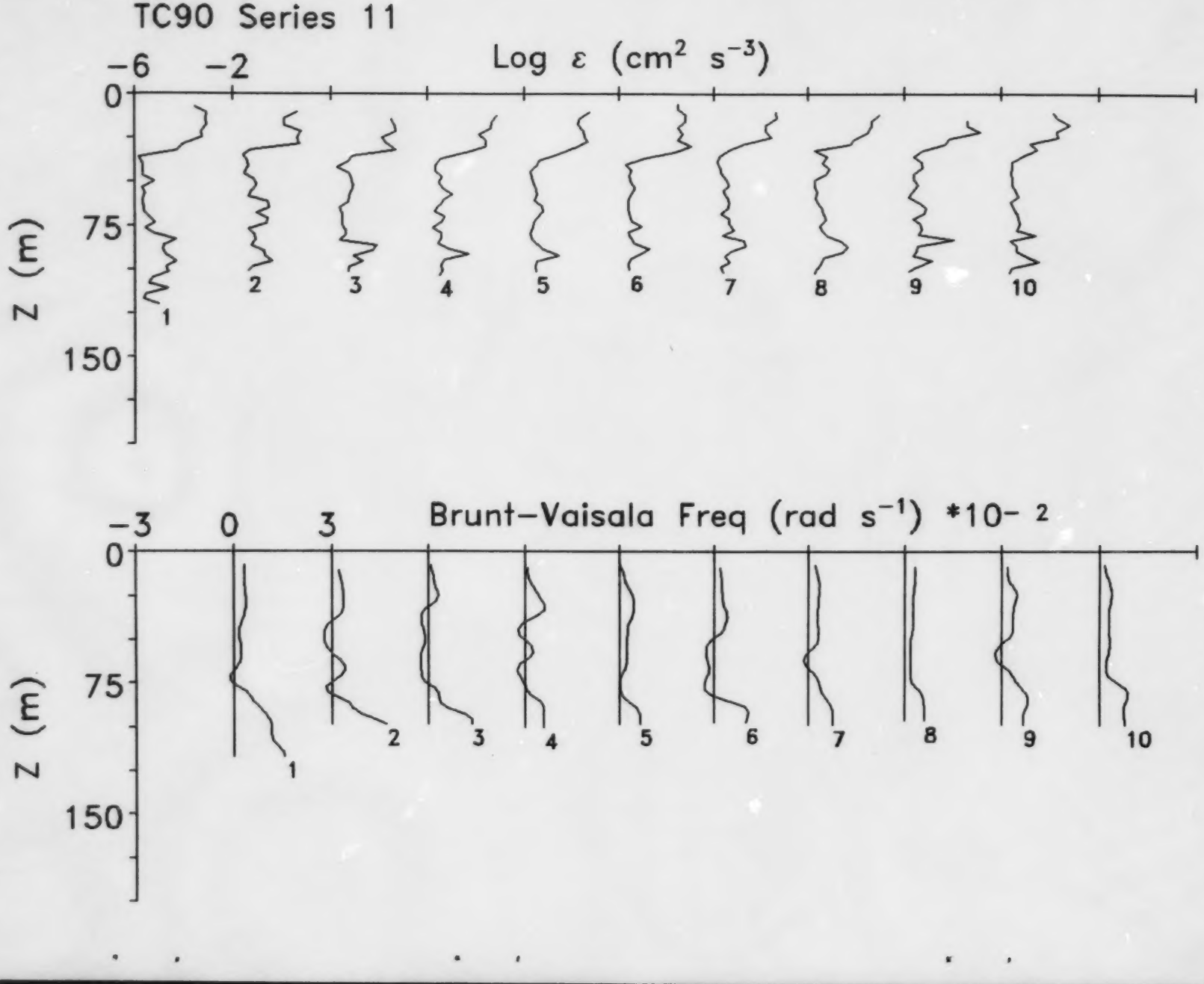

TC90 Series 6
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
15
17
19
20
21
22
23
24
25
26
Brunt−Vaisala Freq (rad s⁻¹) *10- 2
−3
0
3
0
75
150
Z (m)
15
17
19
20
21
22
23
24
25
26

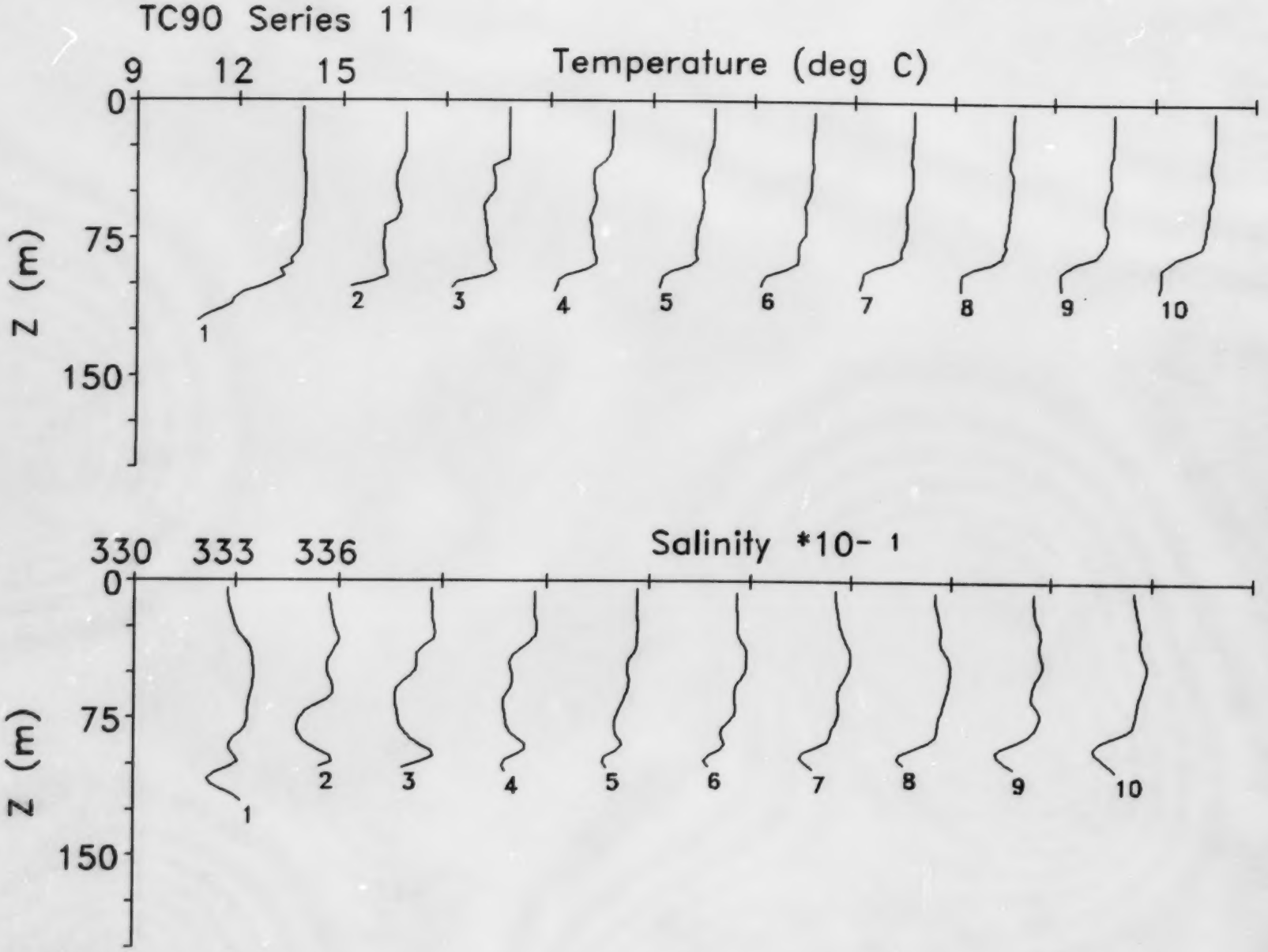

TC90 Series 6
9
12
15
Temperature (deg C)
0
75
150
Z (m)
15
17
19
20
21
22
23
24
25
26
330
333
336
Salinity *10- 1
0
75
150
Z (m)
15
17
19
20
21
22
23
24
25
26

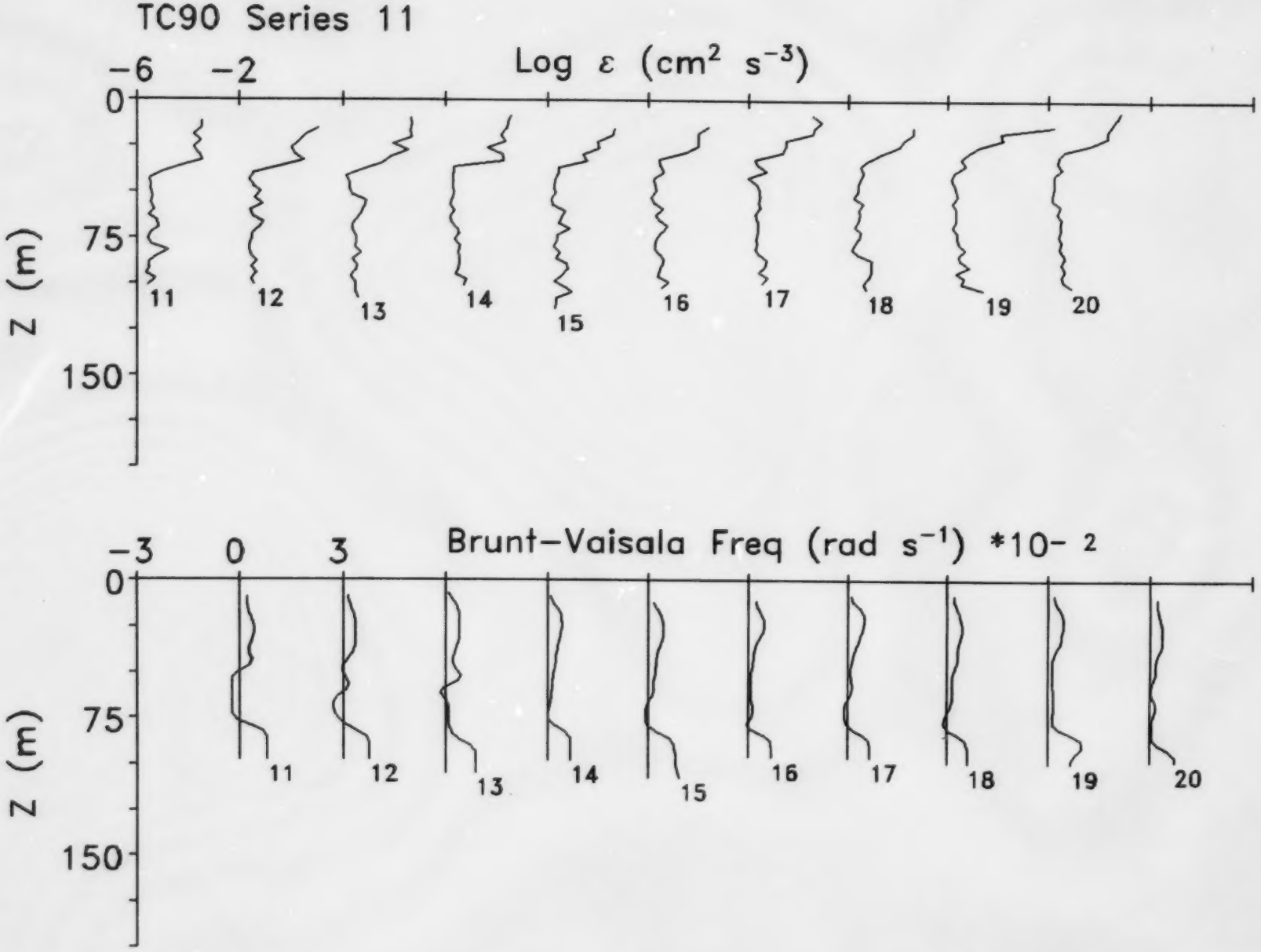

TC90 Series 6
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
27
28
29
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
75
150
Z (m)
27
28
29


TC90 Series 6
Temperature (deg C)
9
12
15
0
75
150
Z (m)
27
28
29


Salinity *10- 1
330
333
336
0
75
150
Z (m)
27
28
29


TC90 Series 11
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10


TC90 Series 11
9
12
15
Temperature (deg C)
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10
330
333
336
Salinity *10- 1
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10


TC90 Series 11
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
11
12
13
14
15
16
17
18
19
20
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
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0
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150
Z (m)
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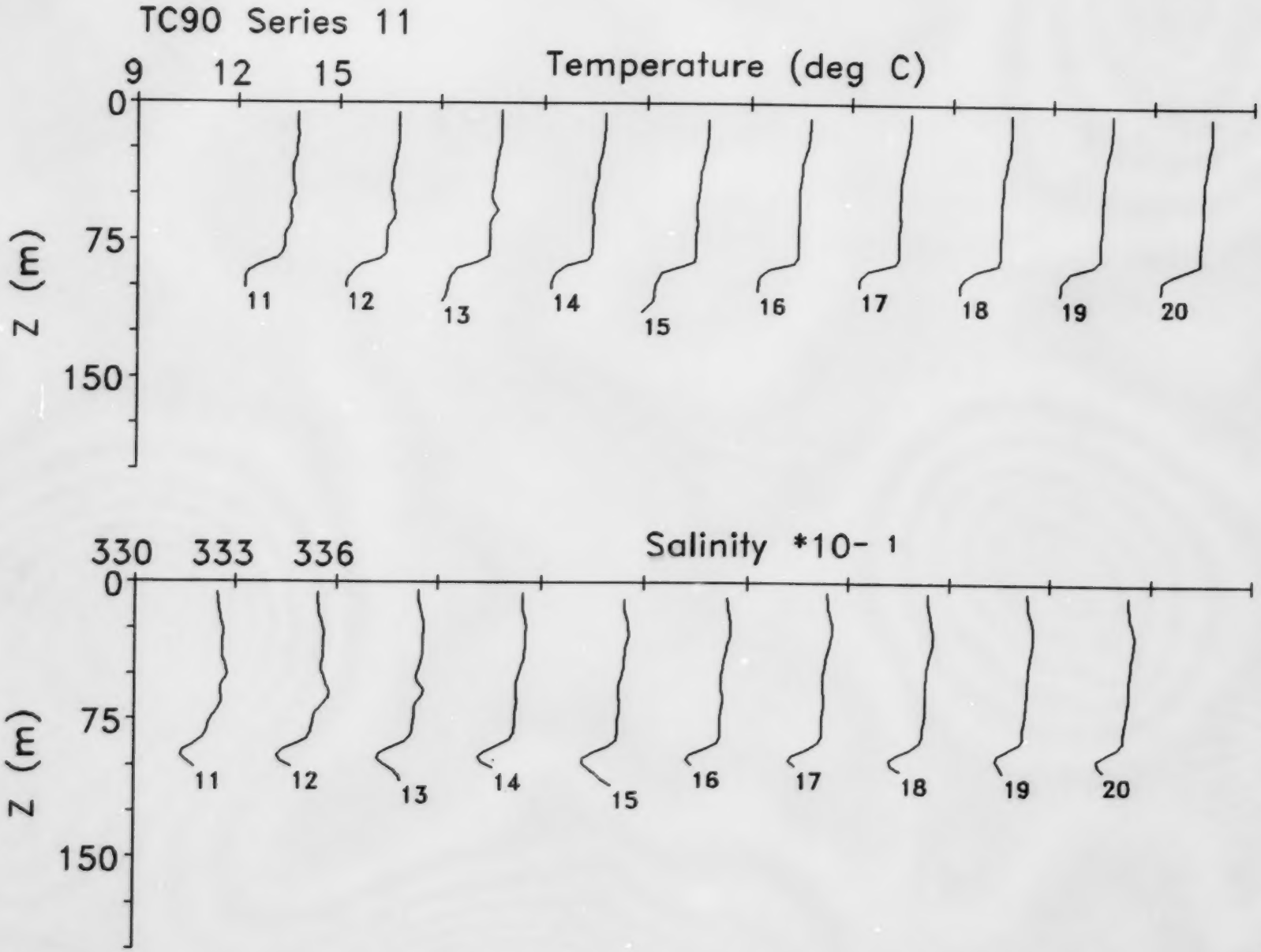
TC90 Series 11
9
12
15
Temperature (deg C)
0
75
150
Z (m)
11
12
13
14
15
16
17
18
19
20
330
333
336
Salinity *10- 1
0
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150
Z (m)
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13
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18
19
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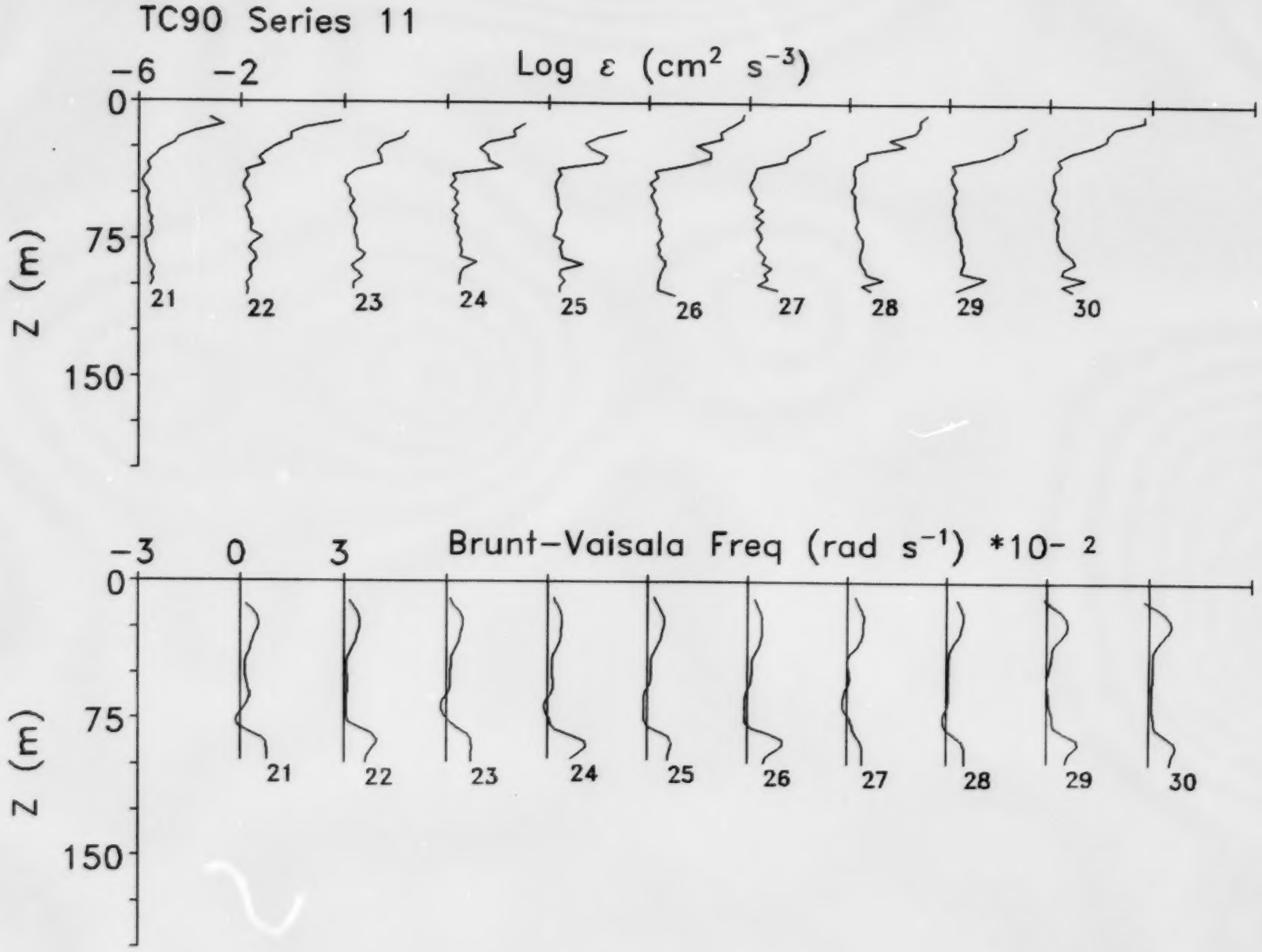
TC90 Series 11
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
21
22
23
24
25
26
27
28
29
30
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
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3
0
75
150
Z (m)
21
22
23
24
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27
28
29
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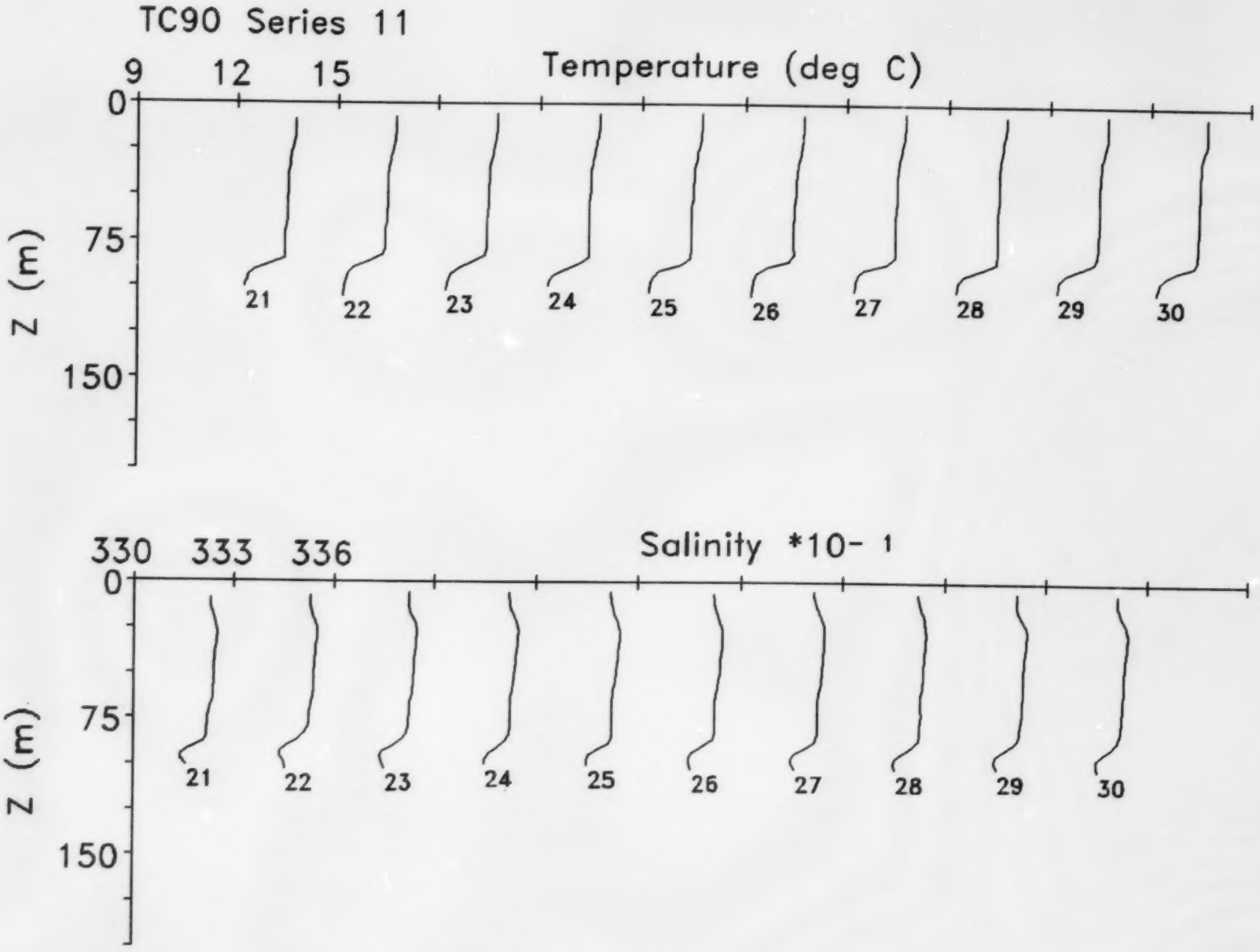
TC90 Series 11
9
12
15
Temperature (deg C)
0
75
150
Z (m)
21
22
23
24
25
26
27
28
29
30
330
333
336
Salinity *10- 1
0
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150
Z (m)
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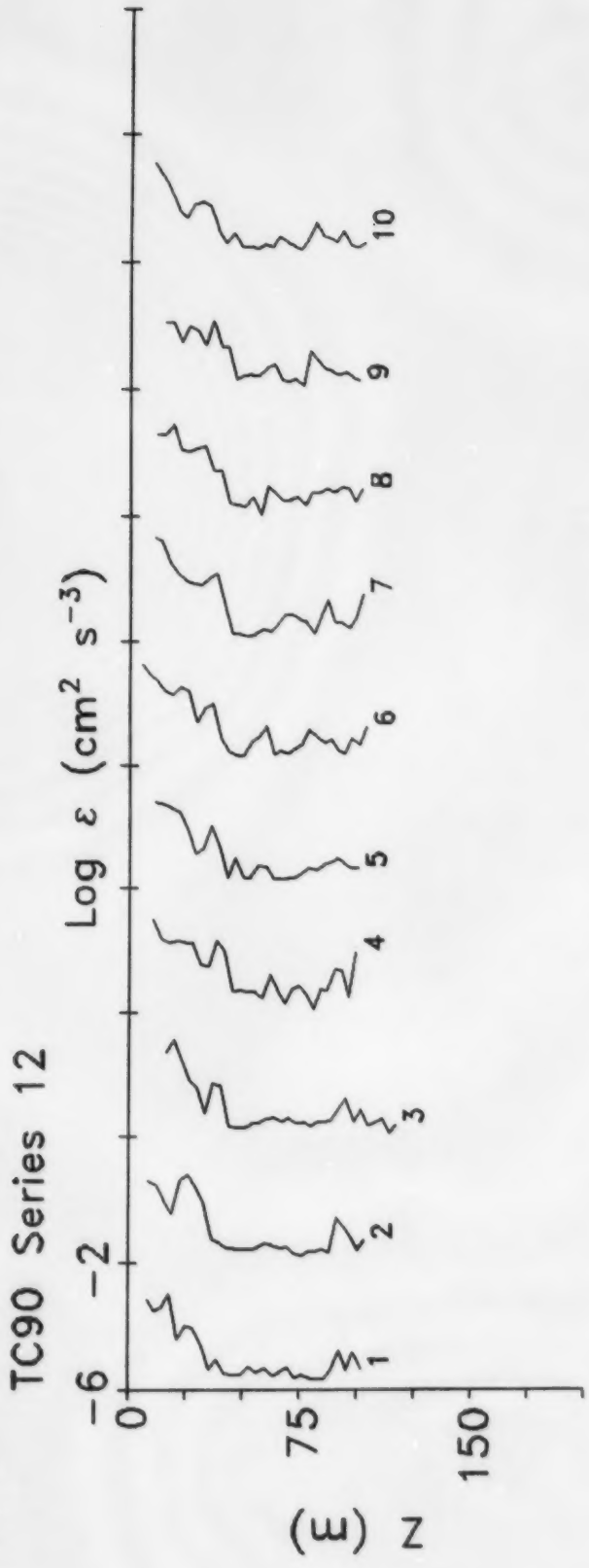
TC90 Series 12
Log ε (cm² s⁻³)
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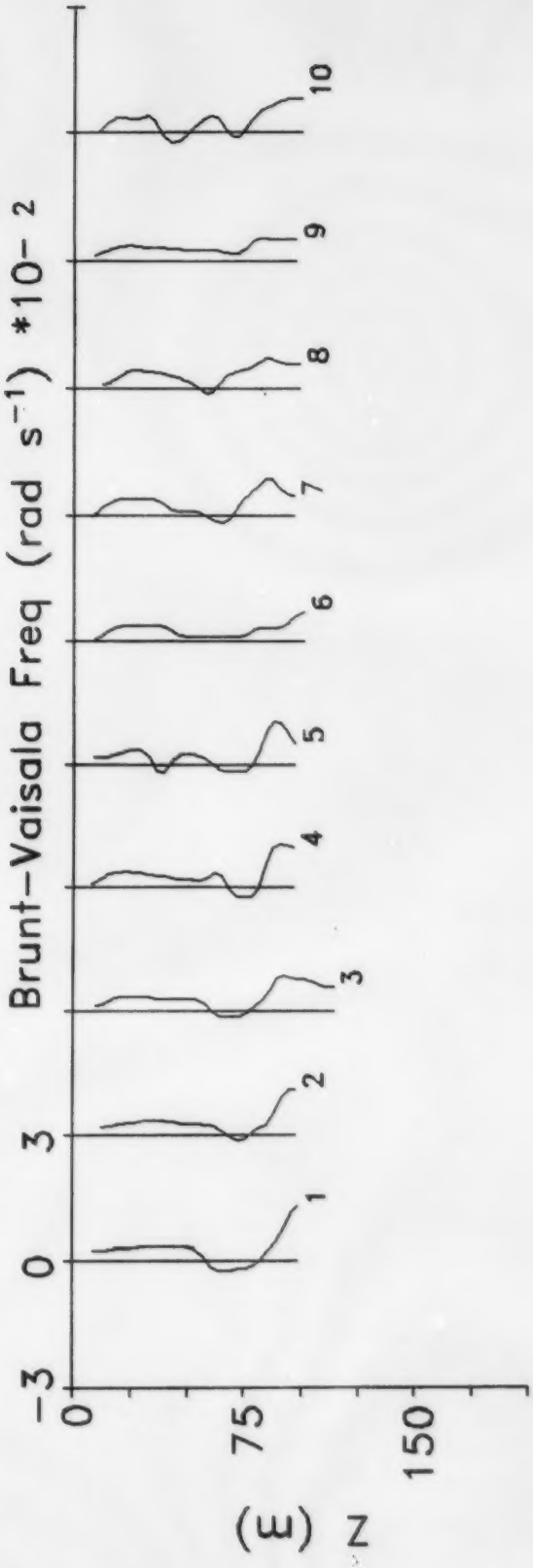
−2
1
2
3
4
5
6
7
8
9
10
0
75
150
Z (m)


Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
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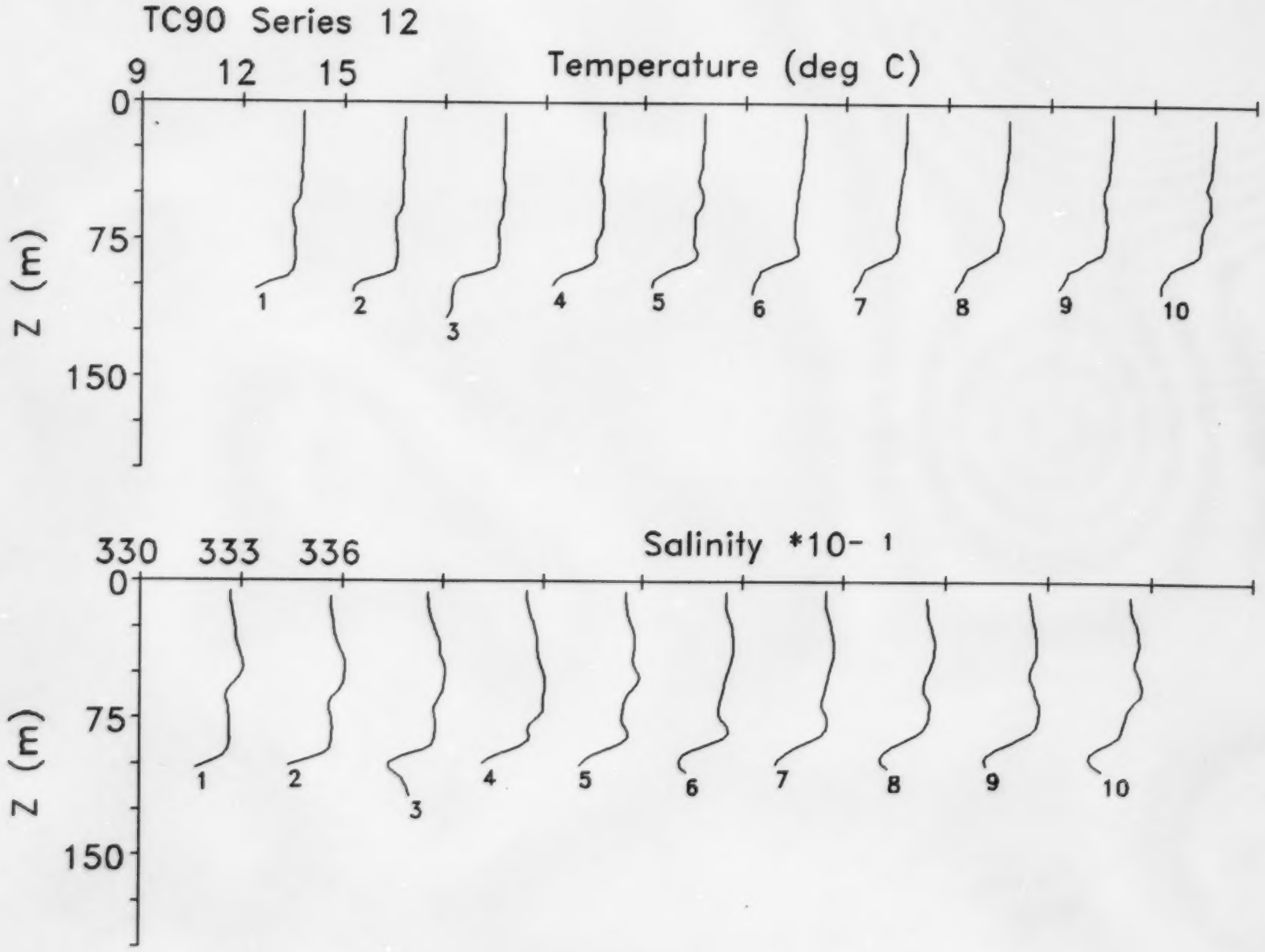
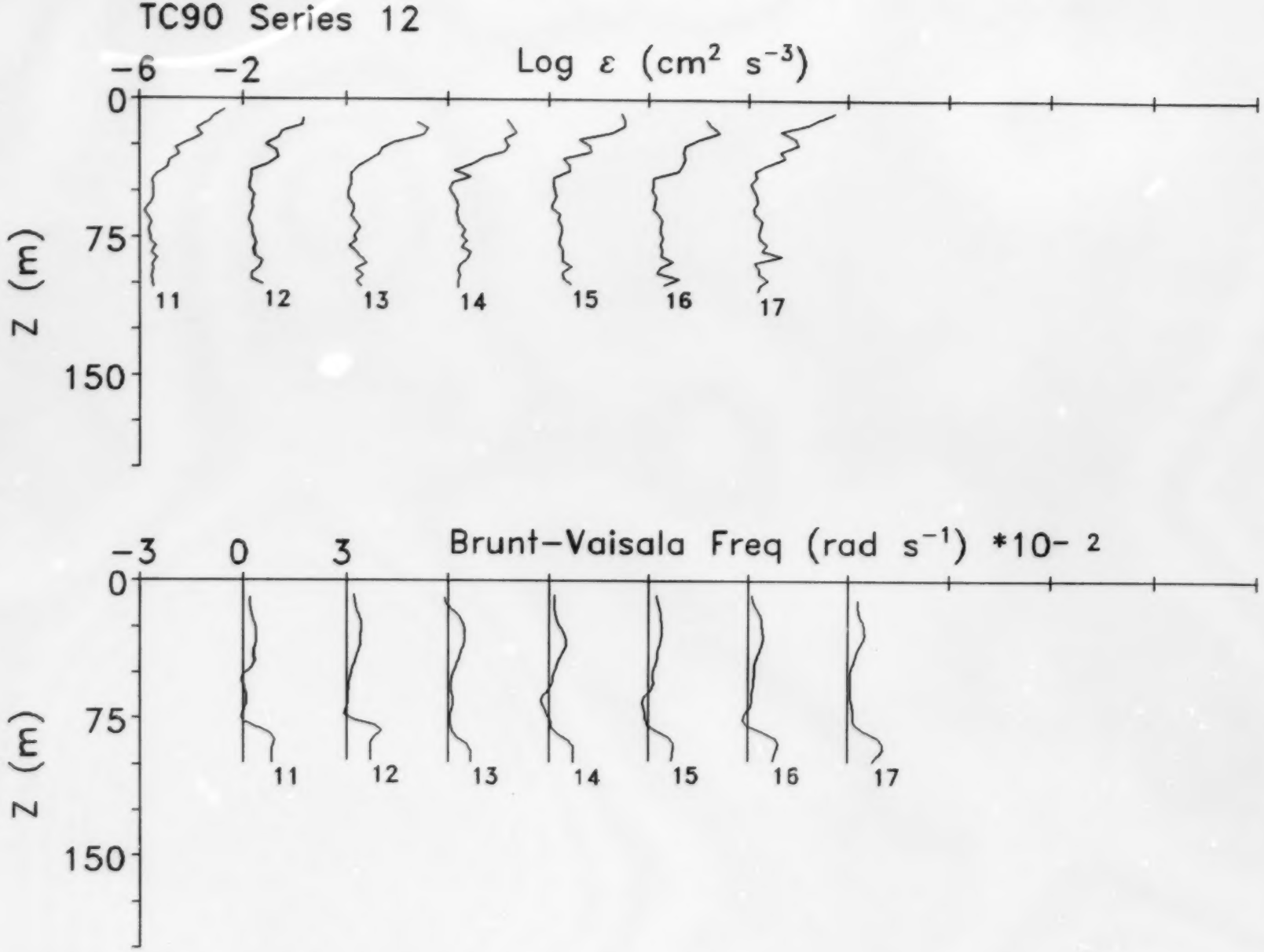
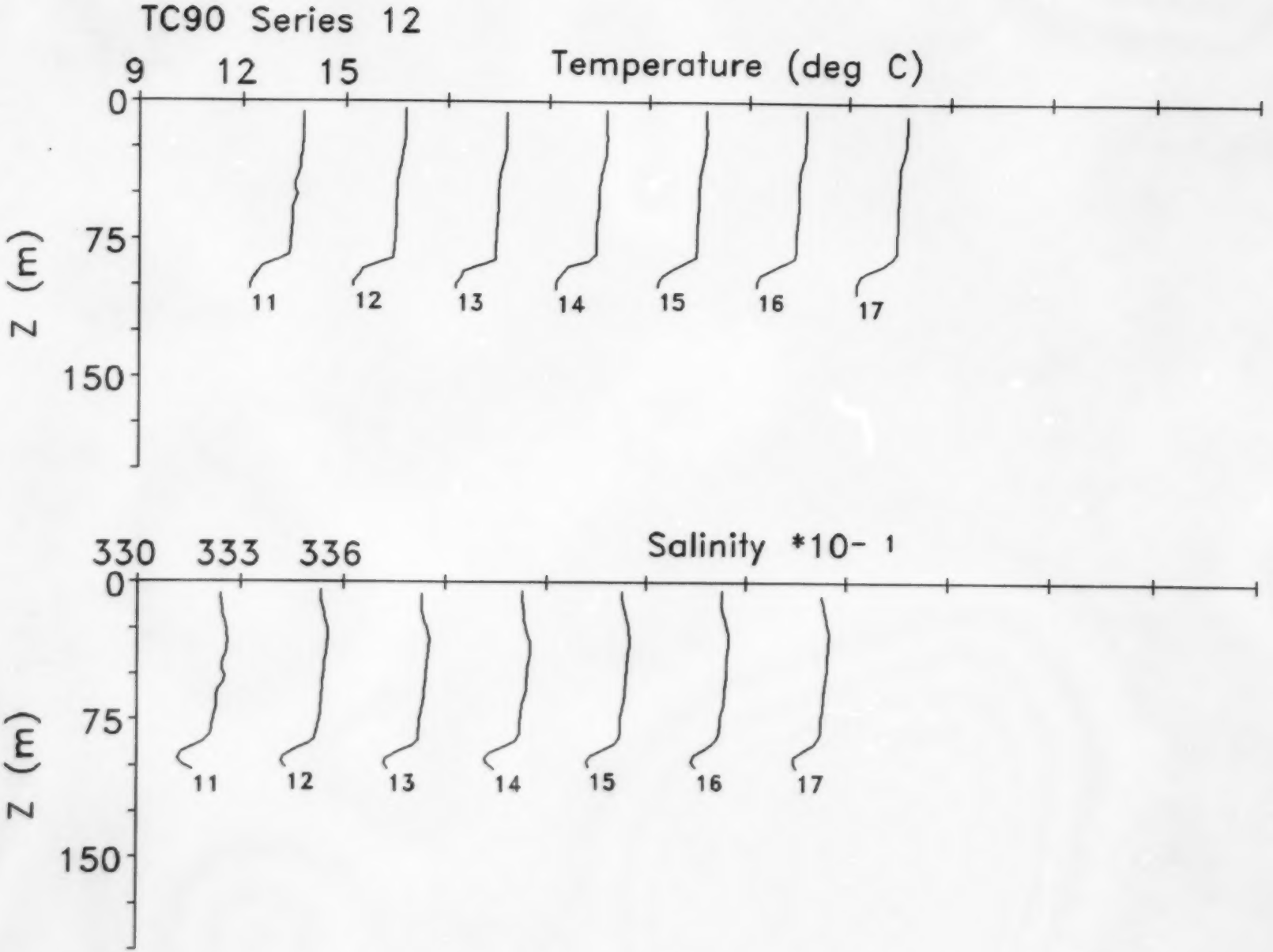
3
1
2
3
4
5
6
7
8
9
10
0
75
150
Z (m)


TC90 Series 12
9
12
15
Temperature (deg C)
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10
330
333
336
Salinity *10- 1
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10


TC90 Series 12
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
11
12
13
14
15
16
17
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
75
150
Z (m)
11
12
13
14
15
16
17


TC90 Series 12
9
12
15
Temperature (deg C)
0
75
150
Z (m)
11
12
13
14
15
16
17
330
333
336
Salinity *10- 1
0
75
150
Z (m)
11
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14
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16
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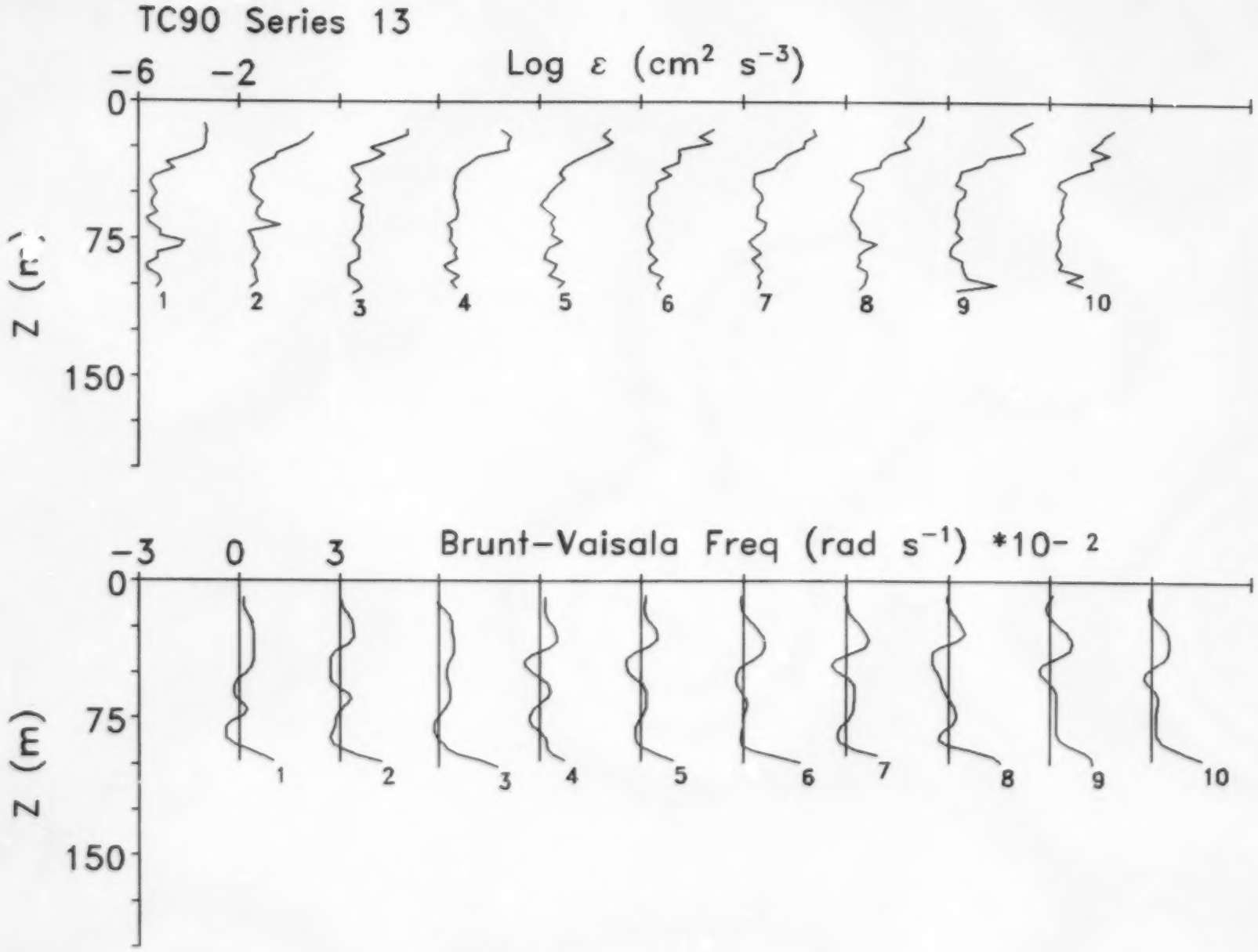
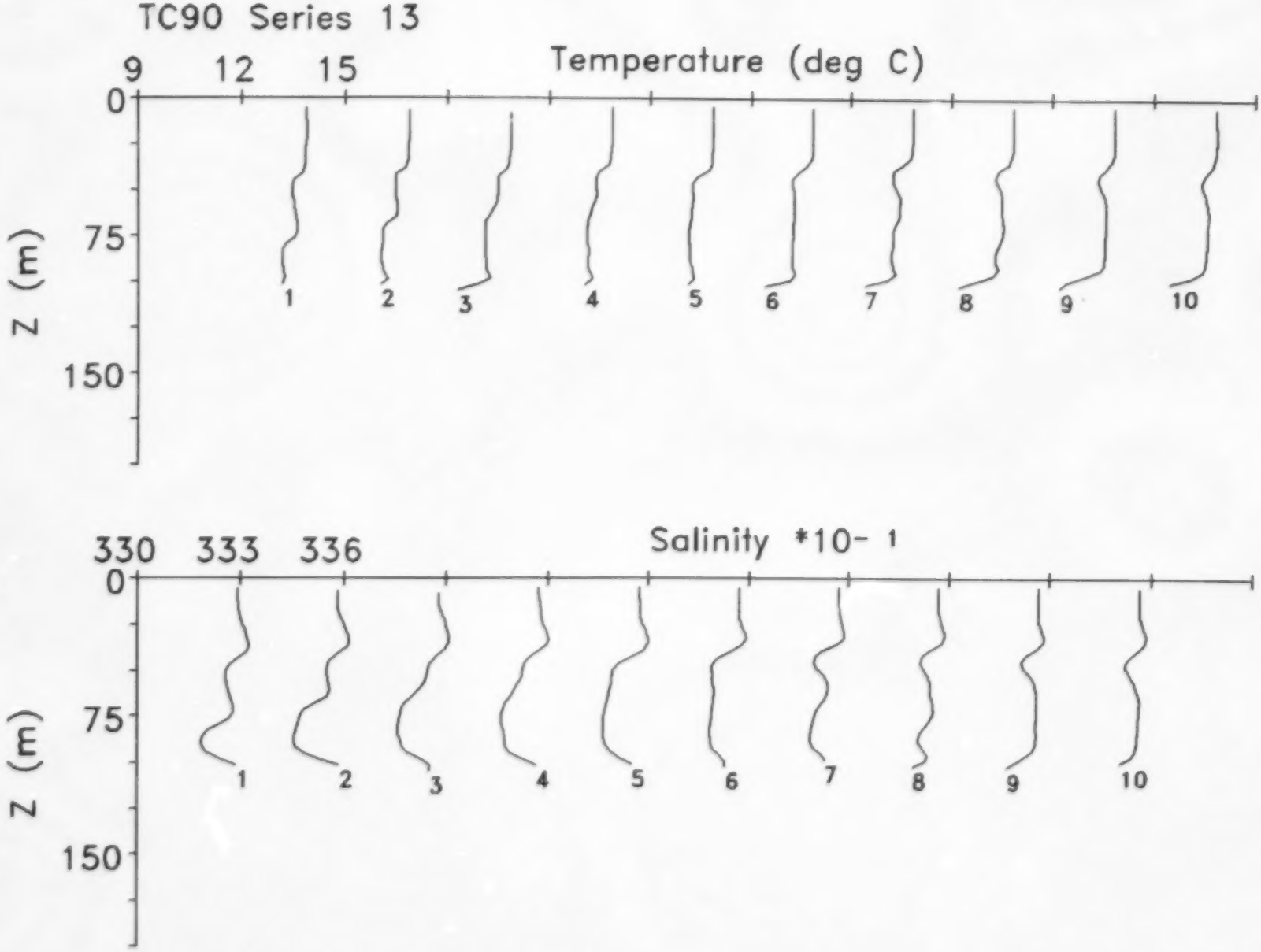
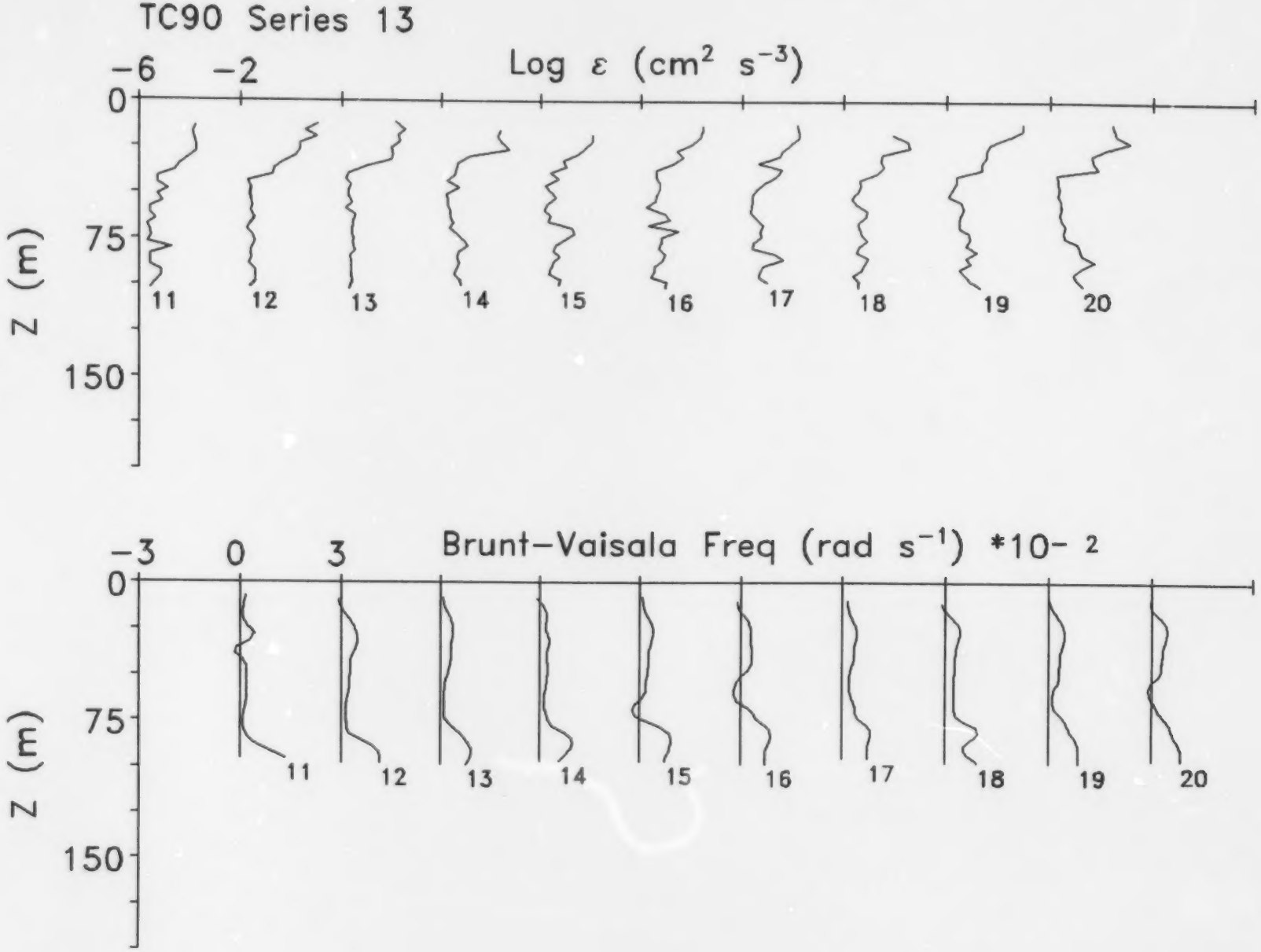
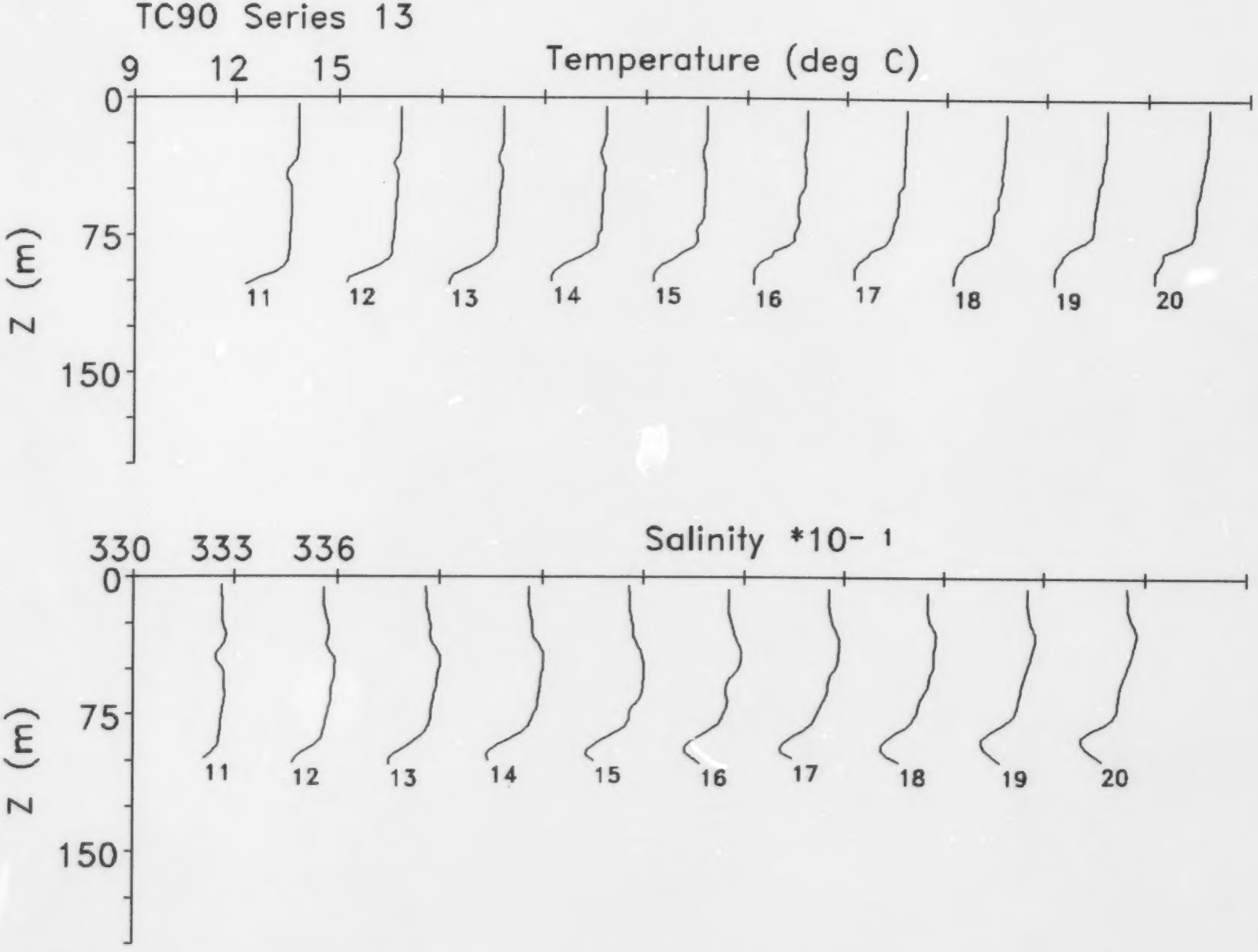

TC90 Series 13
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10


TC90 Series 13
Temperature (deg C)
9
12
15
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10
Salinity *10- 1
330
333
336
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10


TC90 Series 13
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
11
12
13
14
15
16
17
18
19
20
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
75
150
Z (m)
11
12
13
14
15
16
17
18
19
20


TC90 Series 13
Temperature (deg C)
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12
15
0
75
150
Z (m)
11
12
13
14
15
16
17
18
19
20
Salinity *10- 1
330
333
336
0
75
150
Z (m)
11
12
13
14
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16
17
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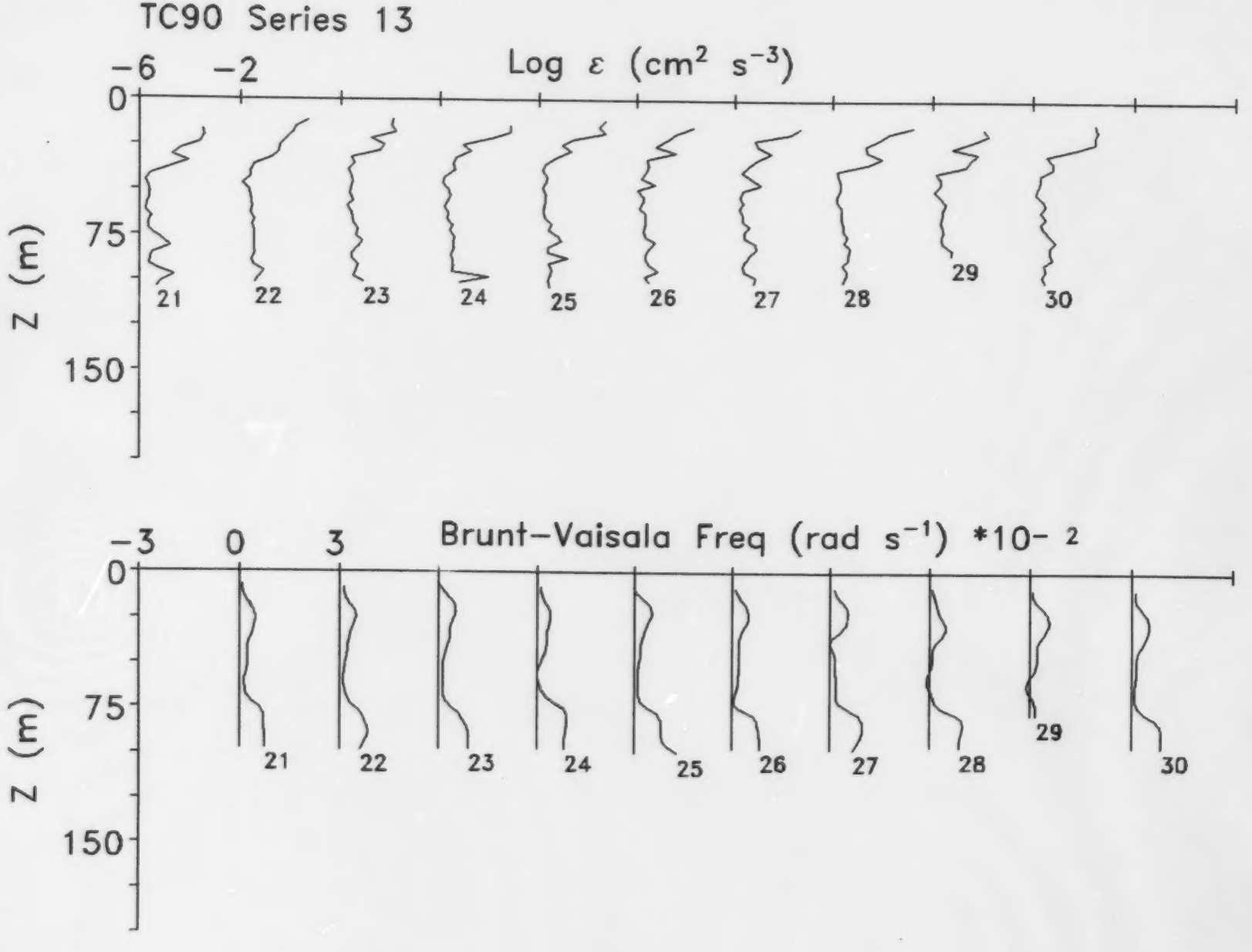
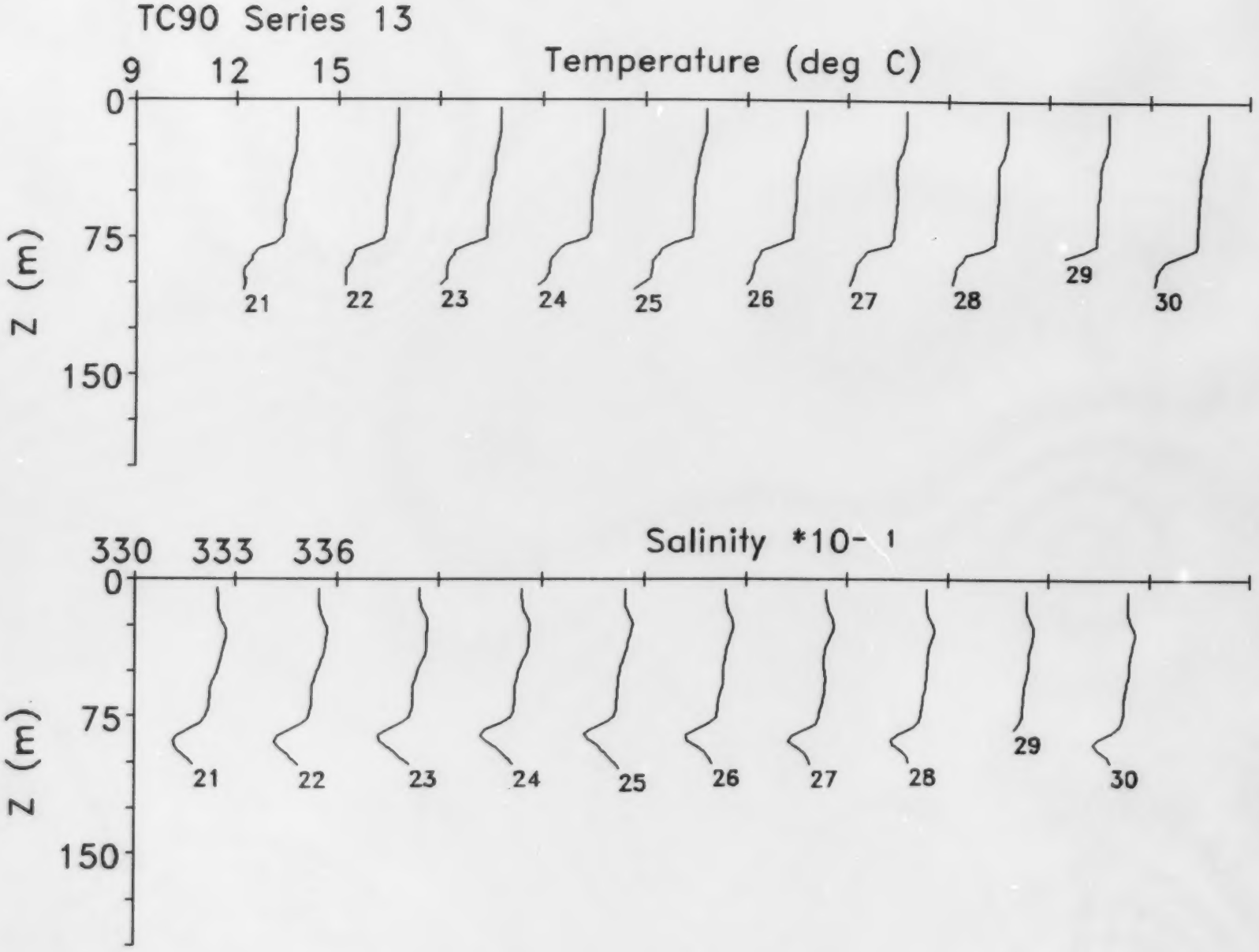
19
20


TC90 Series 13
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
21
22
23
24
25
26
27
28
29
30
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
75
150
Z (m)
21
22
23
24
25
26
27
28
29
30


TC90 Series 13
Temperature (deg C)
9
12
15
0
75
150
Z (m)
21
22
23
24
25
26
27
28
29
30
Salinity *10- 1
330
333
336
0
75
150
Z (m)
21
22
23
24
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27
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29
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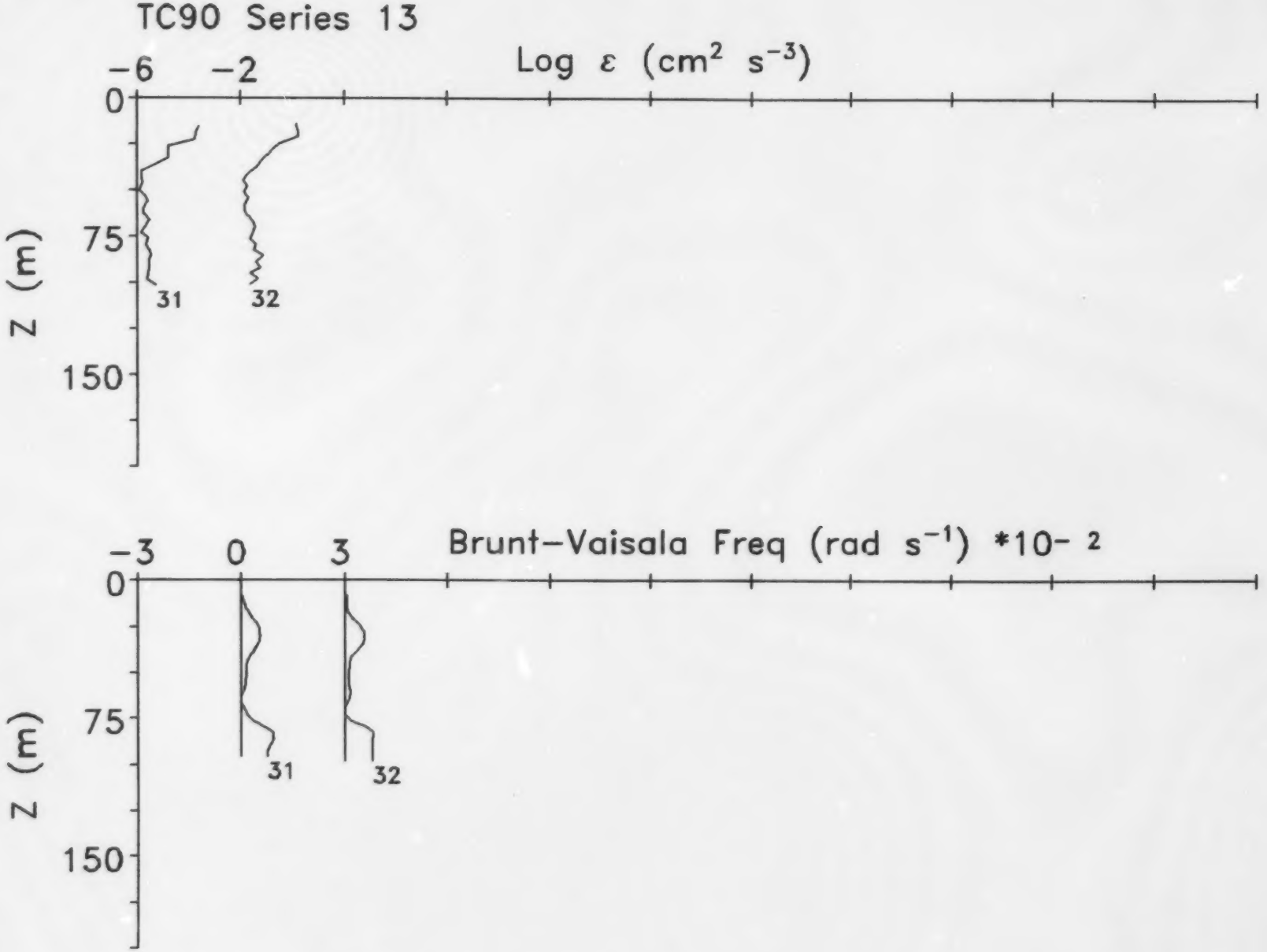
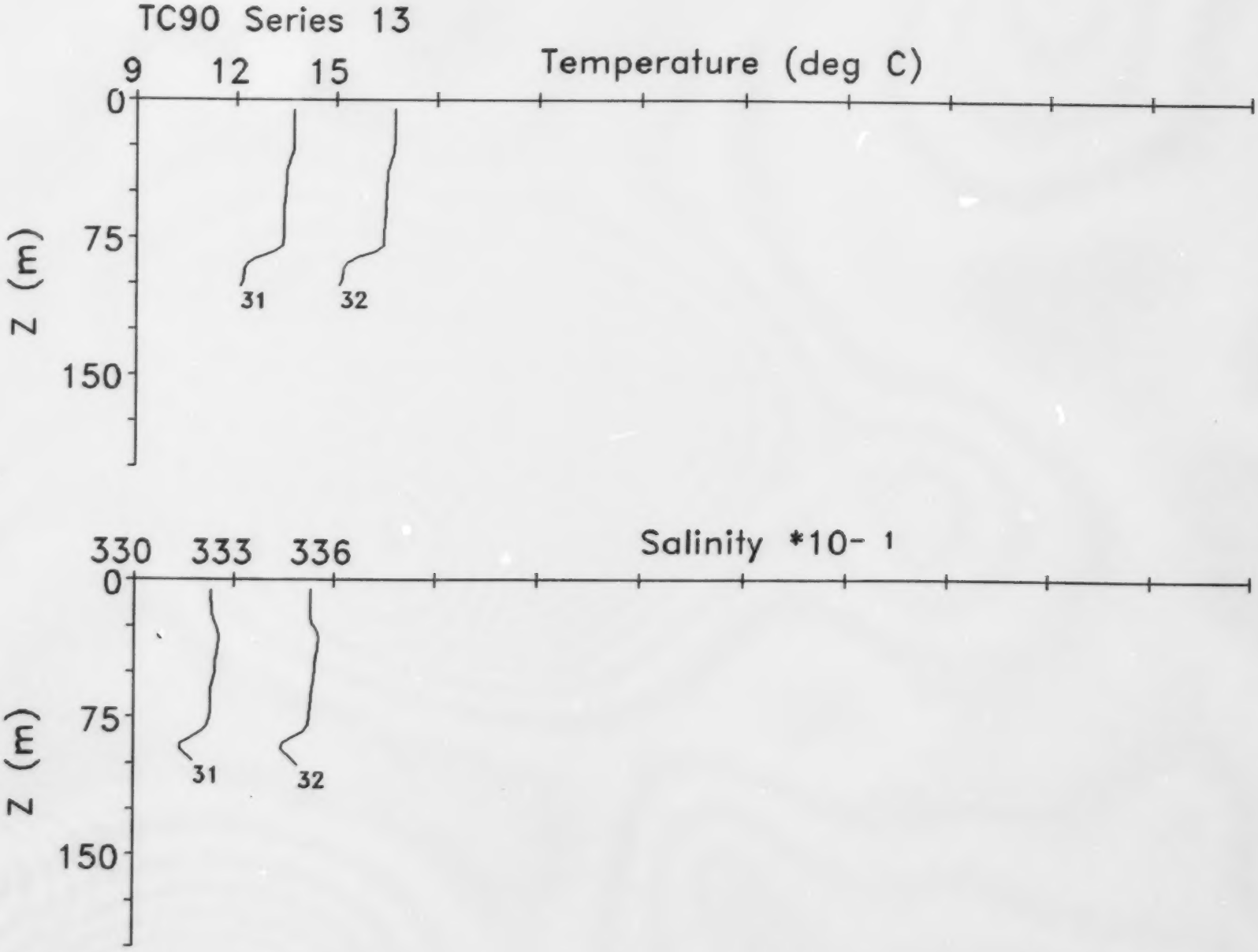
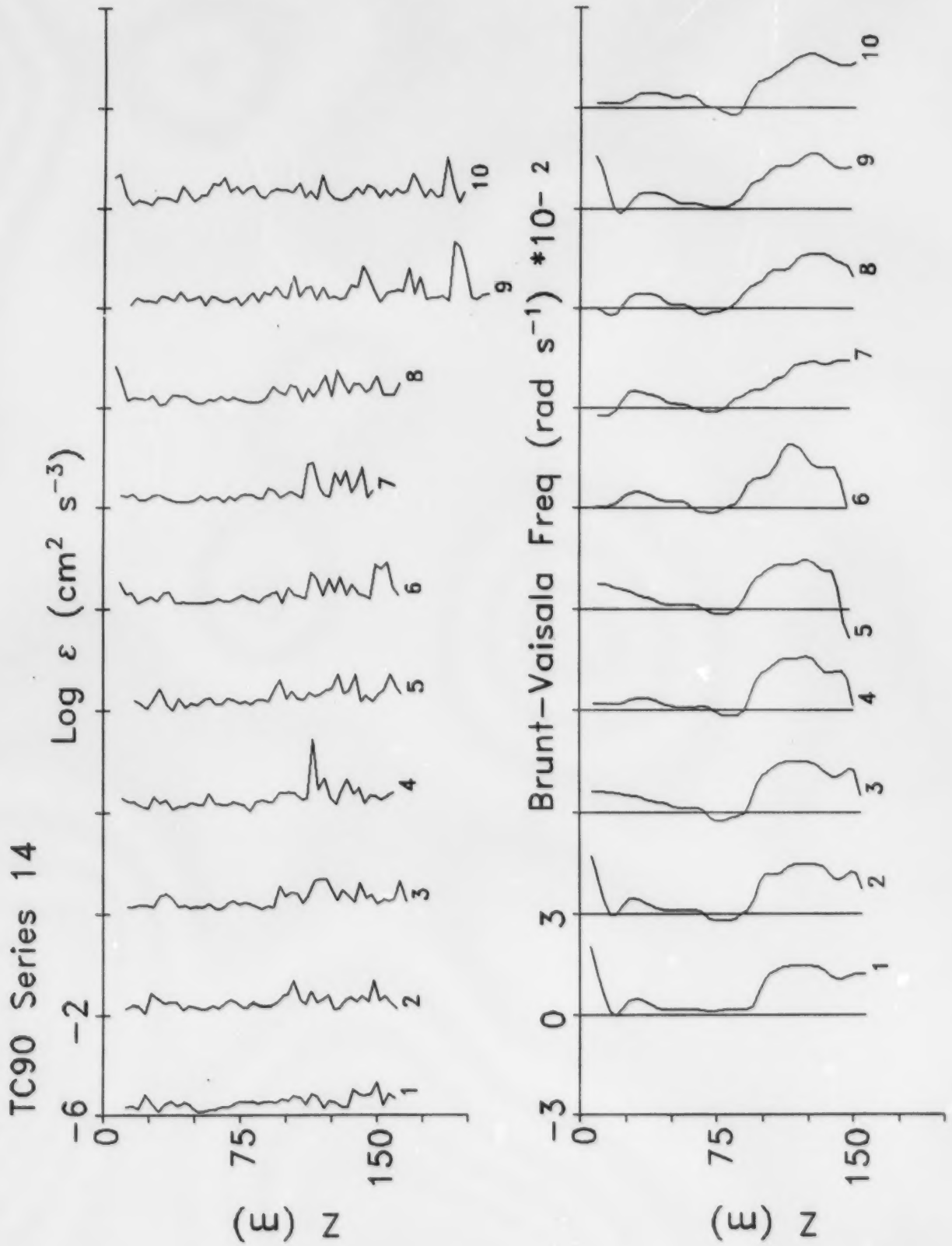
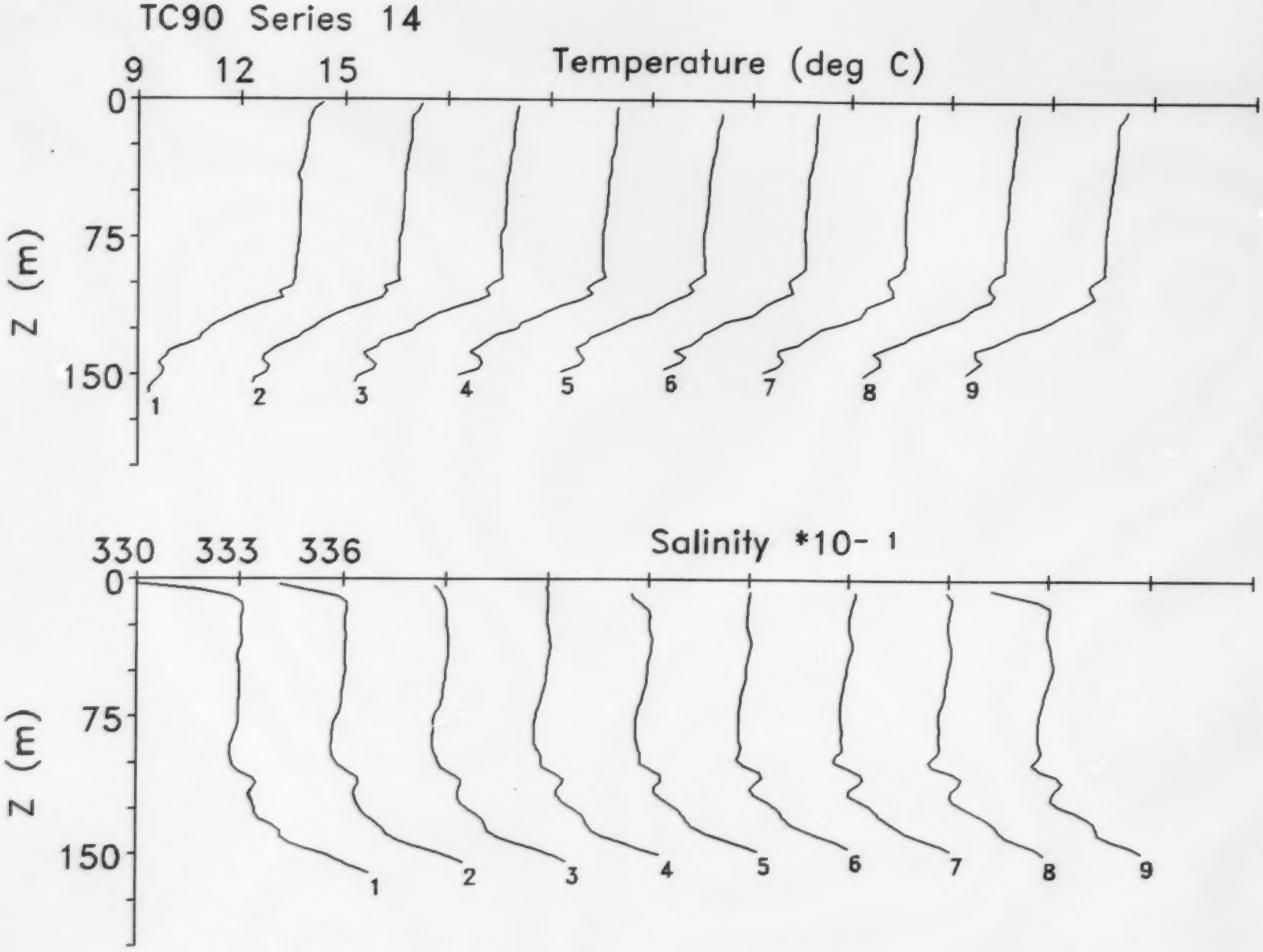

TC90 Series 13
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
31
32
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
75
150
Z (m)
31
32


TC90 Series 13
9
12
15
Temperature (deg C)
0
75
150
Z (m)
31
32
330
333
336
Salinity *10- 1
0
75
150
Z (m)
31
32


TC90 Series 14
Log ε (cm² s⁻³)
Z (m)
0
75
150
-6
-2
1
2
3
4
5
6
7
8
9
10
Brunt-Vaisala Freq (rad s⁻¹) *10⁻²
-3
0
3


TC90 Series 14
9
12
15
Temperature (deg C)
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
330
333
336
Salinity *10- 1
0
75
150
Z (m)
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2
3
4
5
6
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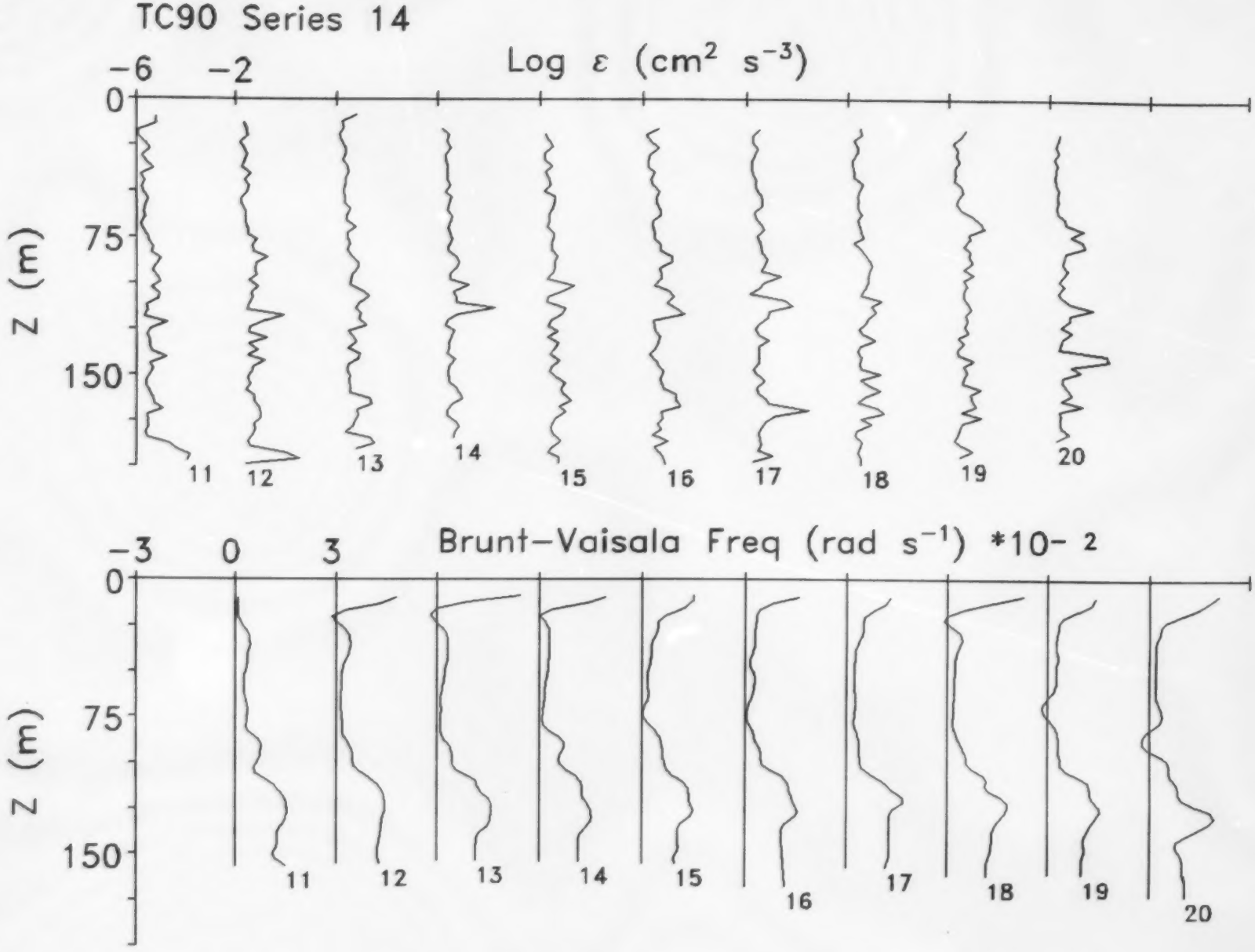
8
9


TC90 Series 14
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
11
12
13
14
15
16
17
18
19
20
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
75
150
Z (m)
11
12
13
14
15
16
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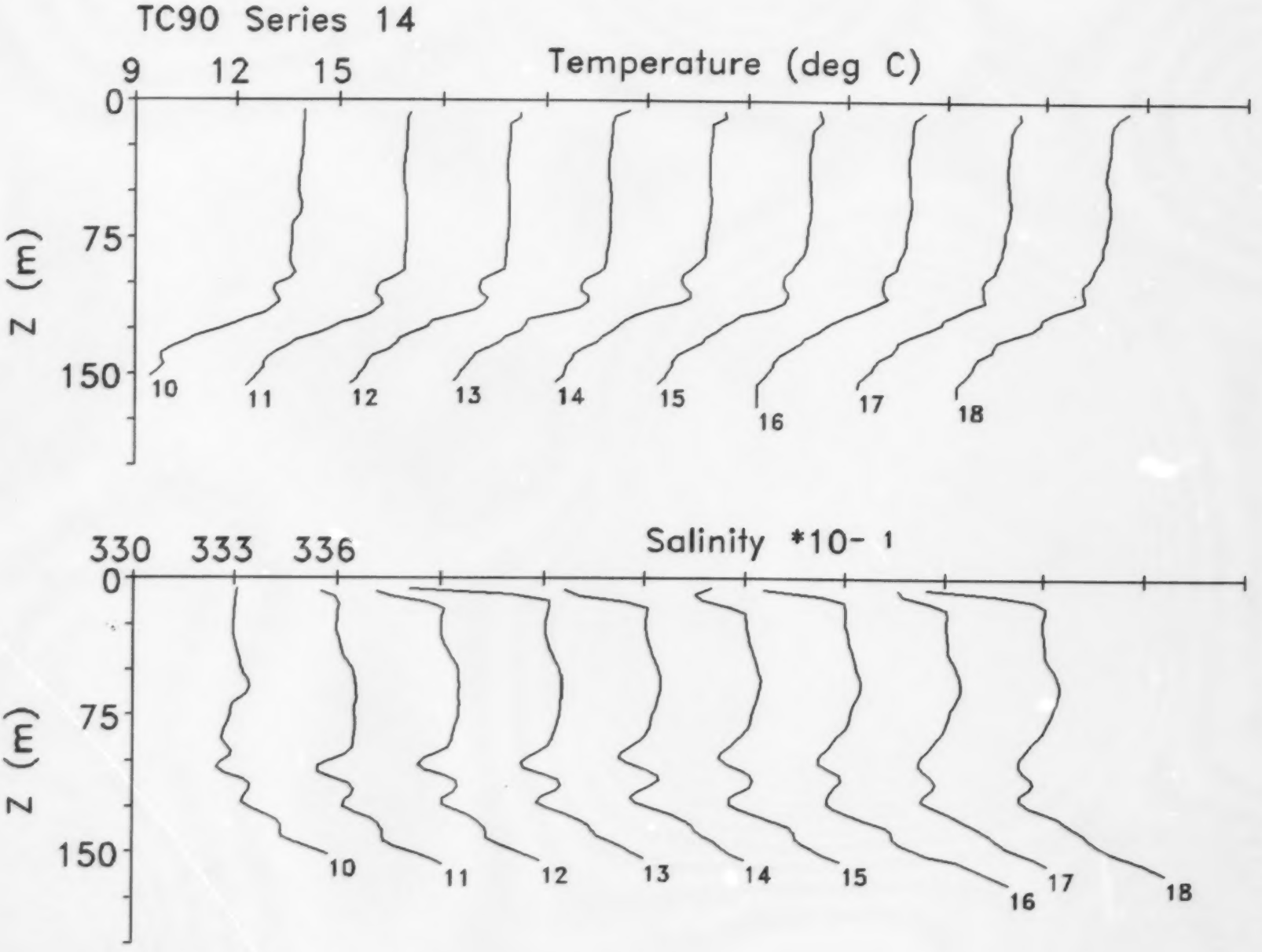
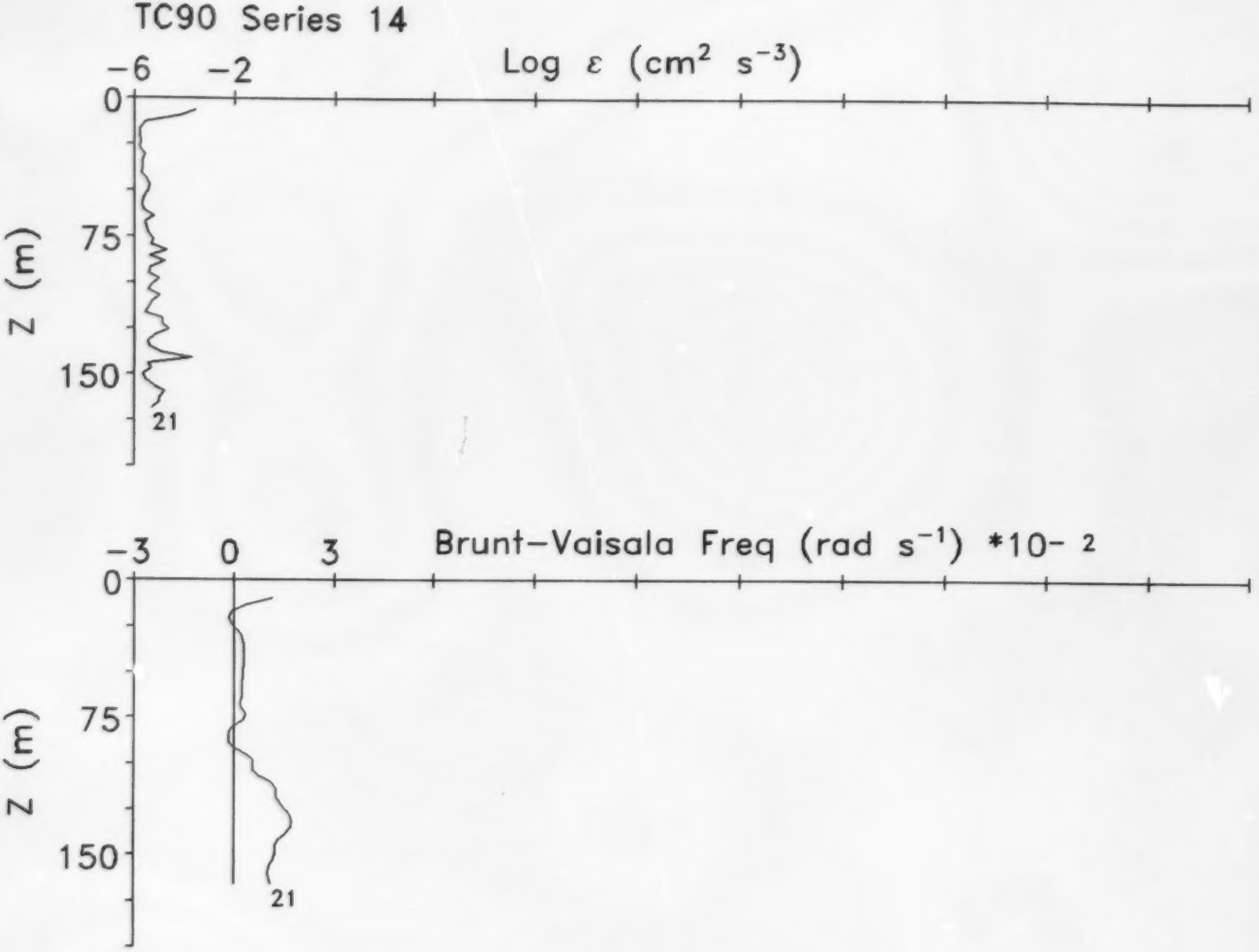
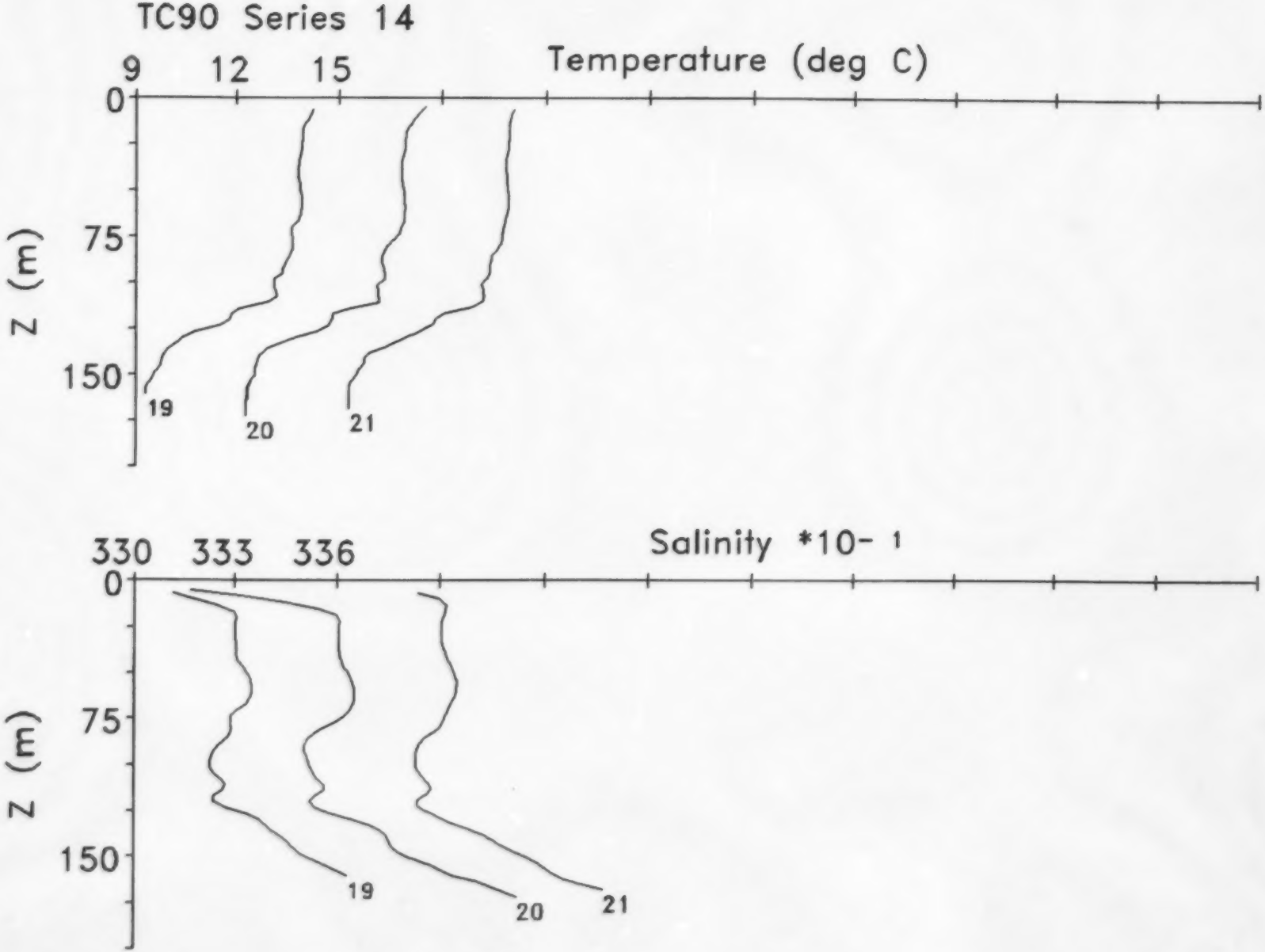
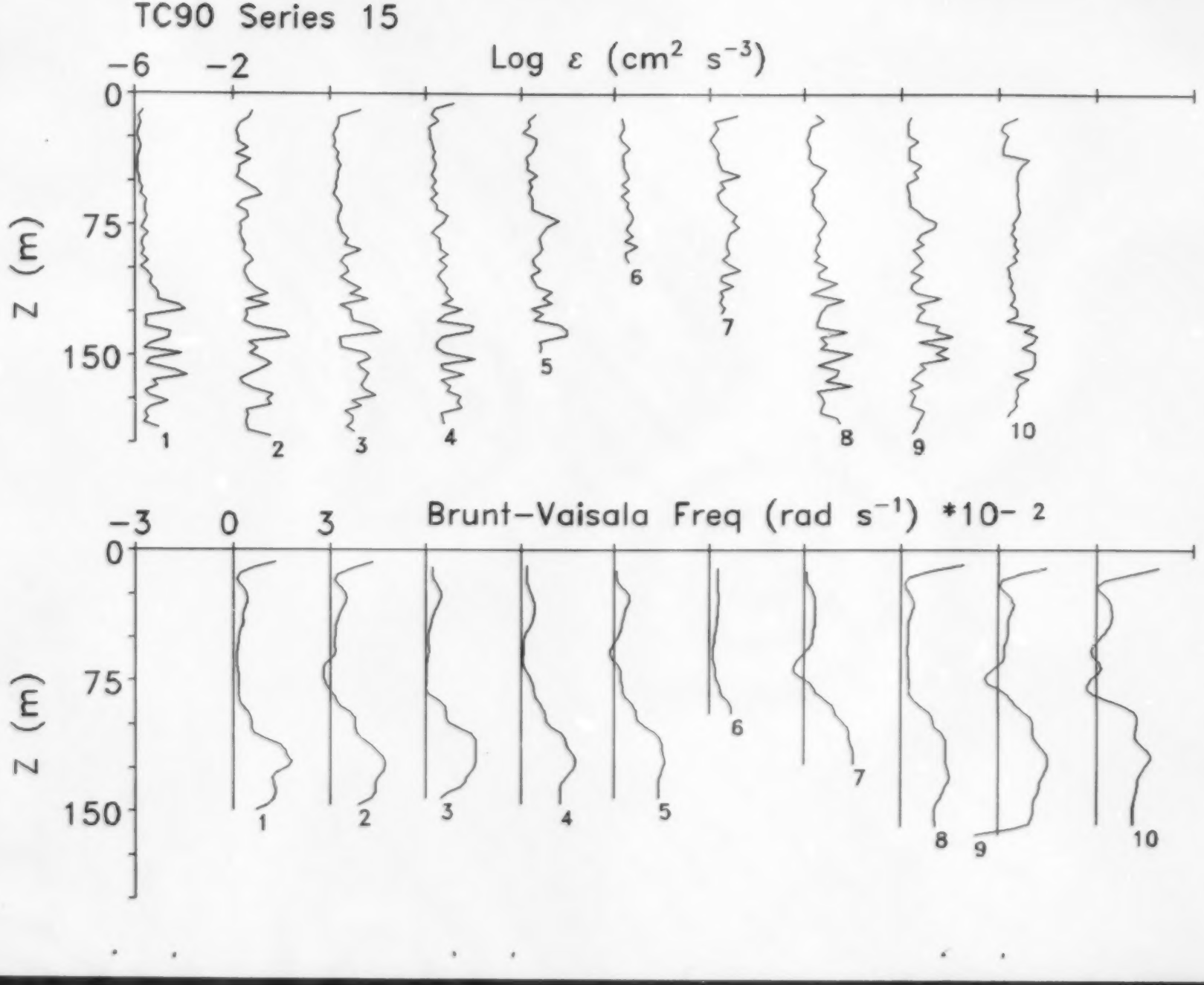
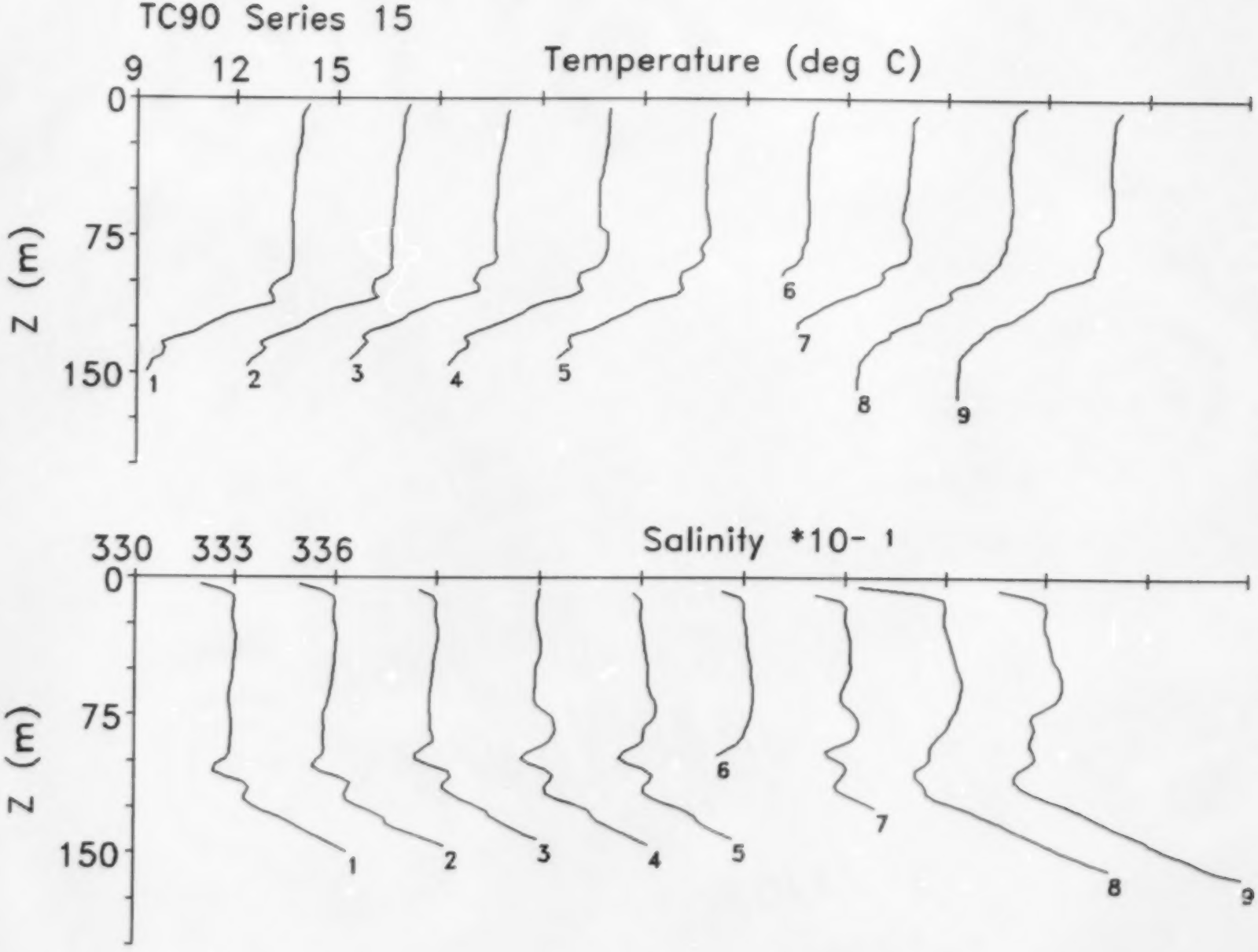
18
19
20

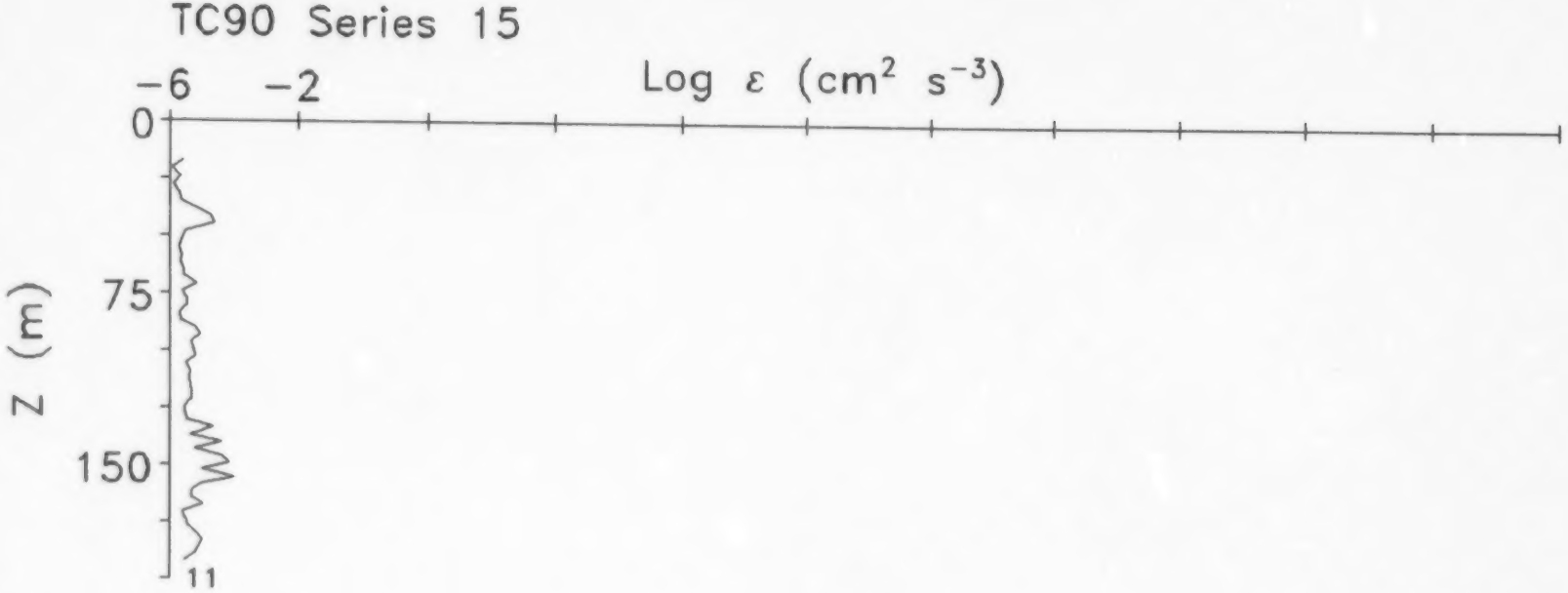

TC90 Series 14
9
12
15
Temperature (deg C)
0
75
150
Z (m)
10
11
12
13
14
15
16
17
18
330
333
336
Salinity *10- 1
0
75
150
Z (m)
10
11
12
13
14
15
16
17
18

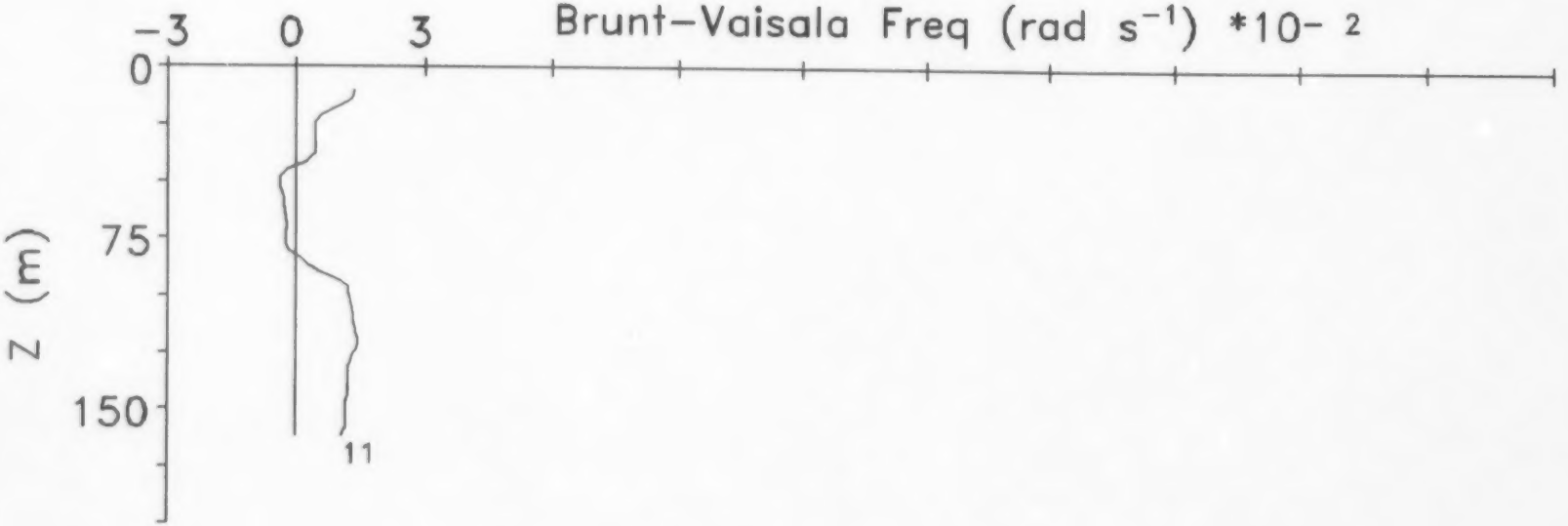

TC90 Series 14
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
21
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
75
150
Z (m)
21

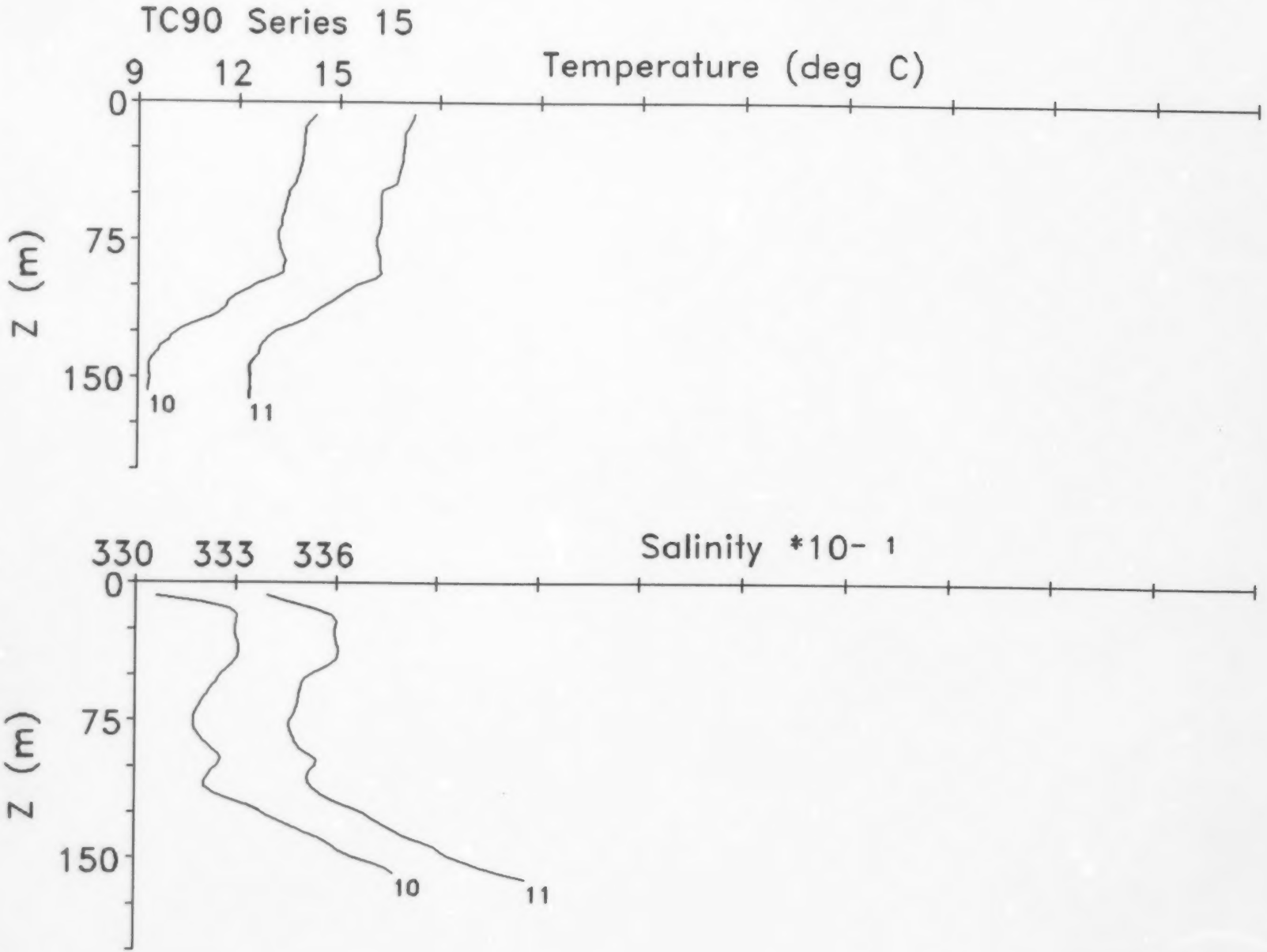

TC90 Series 14
9
12
15
Temperature (deg C)
0
75
150
Z (m)
19
20
21
330
333
336
Salinity *10- 1
0
75
150
Z (m)
19
20
21

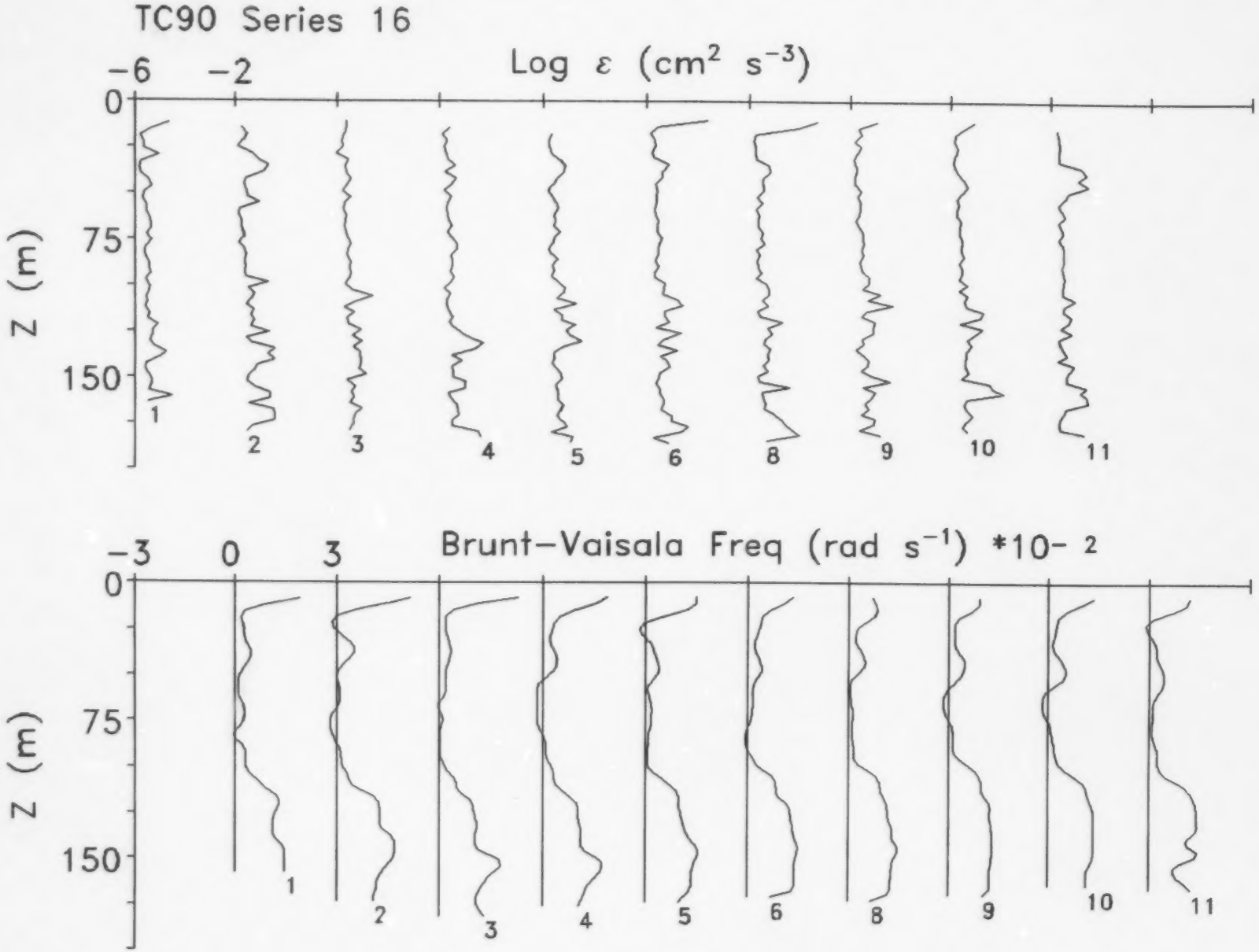

TC90 Series 15
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
10

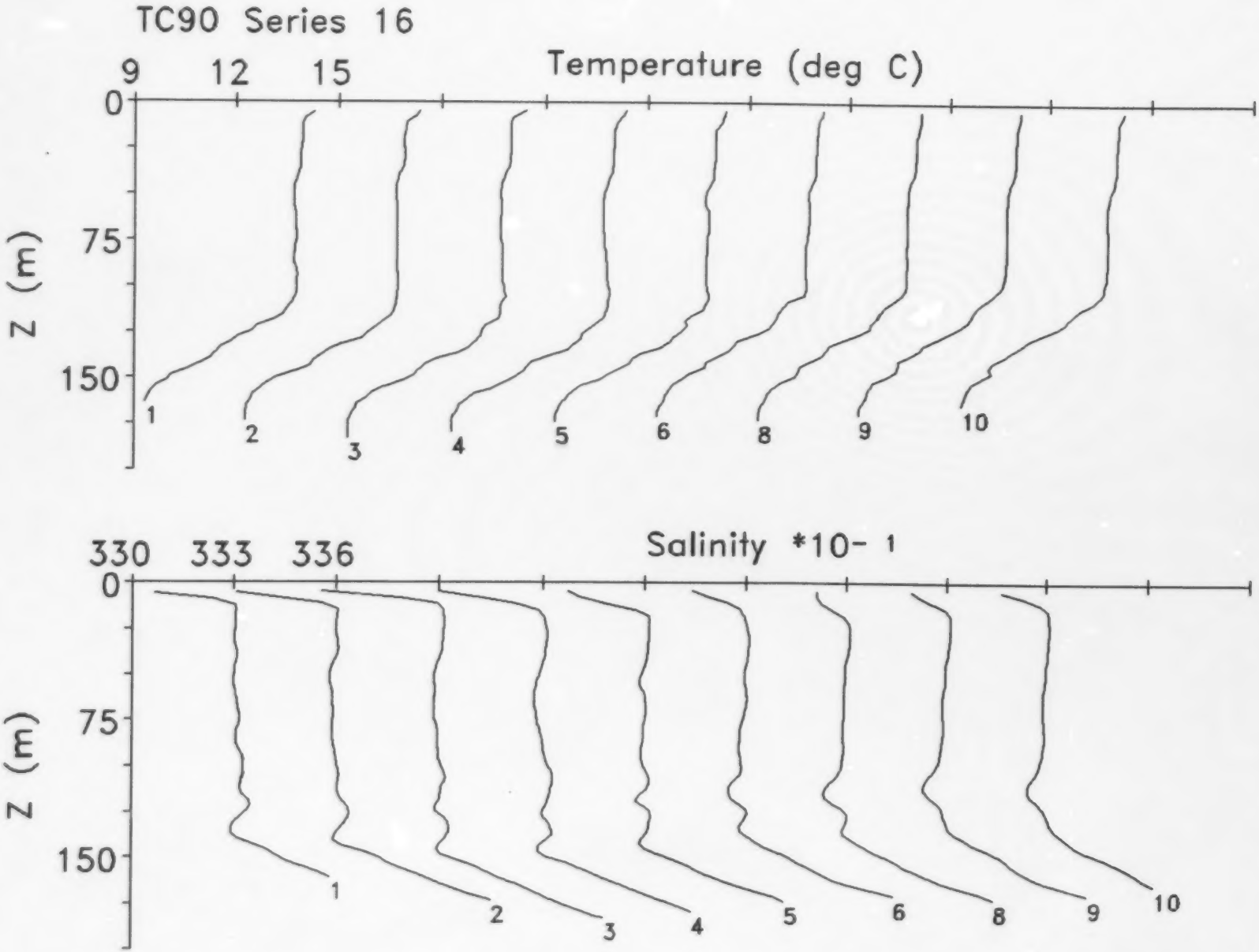

TC90 Series 15
Temperature (deg C)
9
12
15
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9
Salinity *10- 1
330
333
336
0
75
150
Z (m)
1
2
3
4
5
6
7
8
9

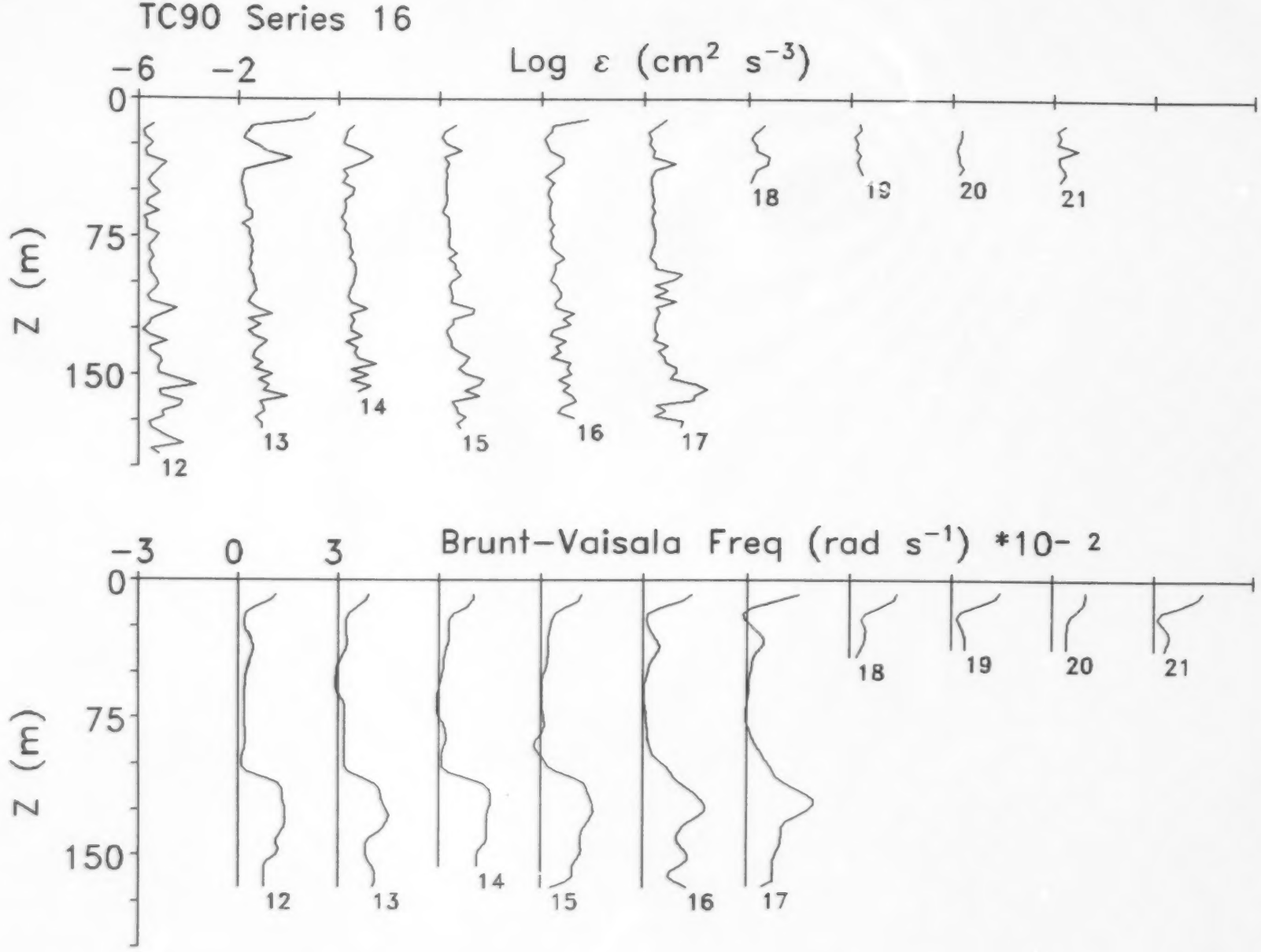

TC90 Series 15
−6
−2
Log ε (cm² s⁻³)
0
75
150
Z (m)
11

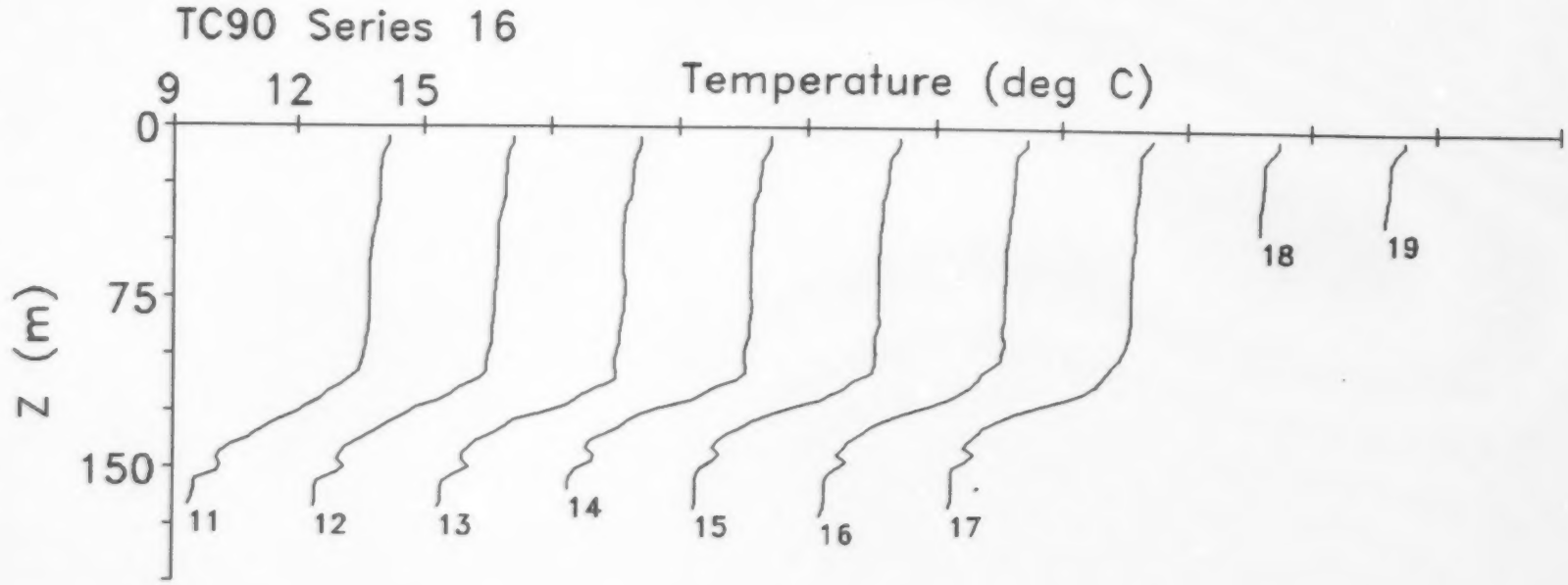

−3
0
3
Brunt−Vaisala Freq (rad s⁻¹) *10- 2
0
75
150
Z (m)
11

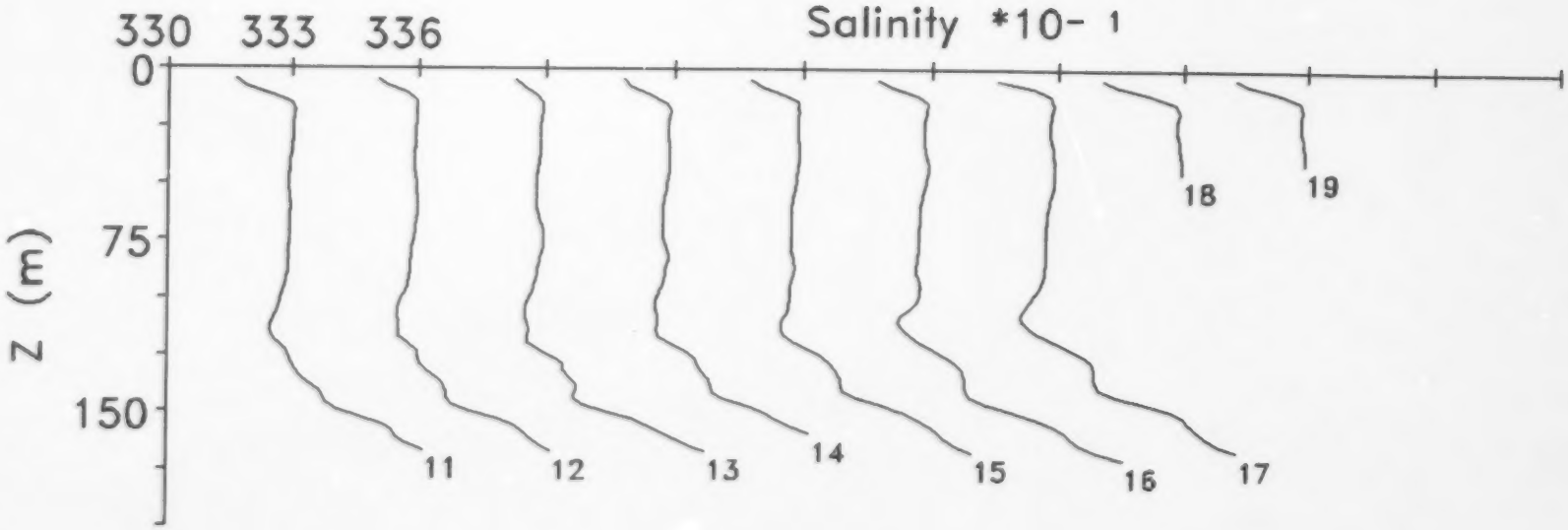

TC90 Series 15
9
12
15
Temperature (deg C)
0
75
150
Z (m)
10
11
330
333
336
Salinity *10- 1
0
75
150
Z (m)
10
11

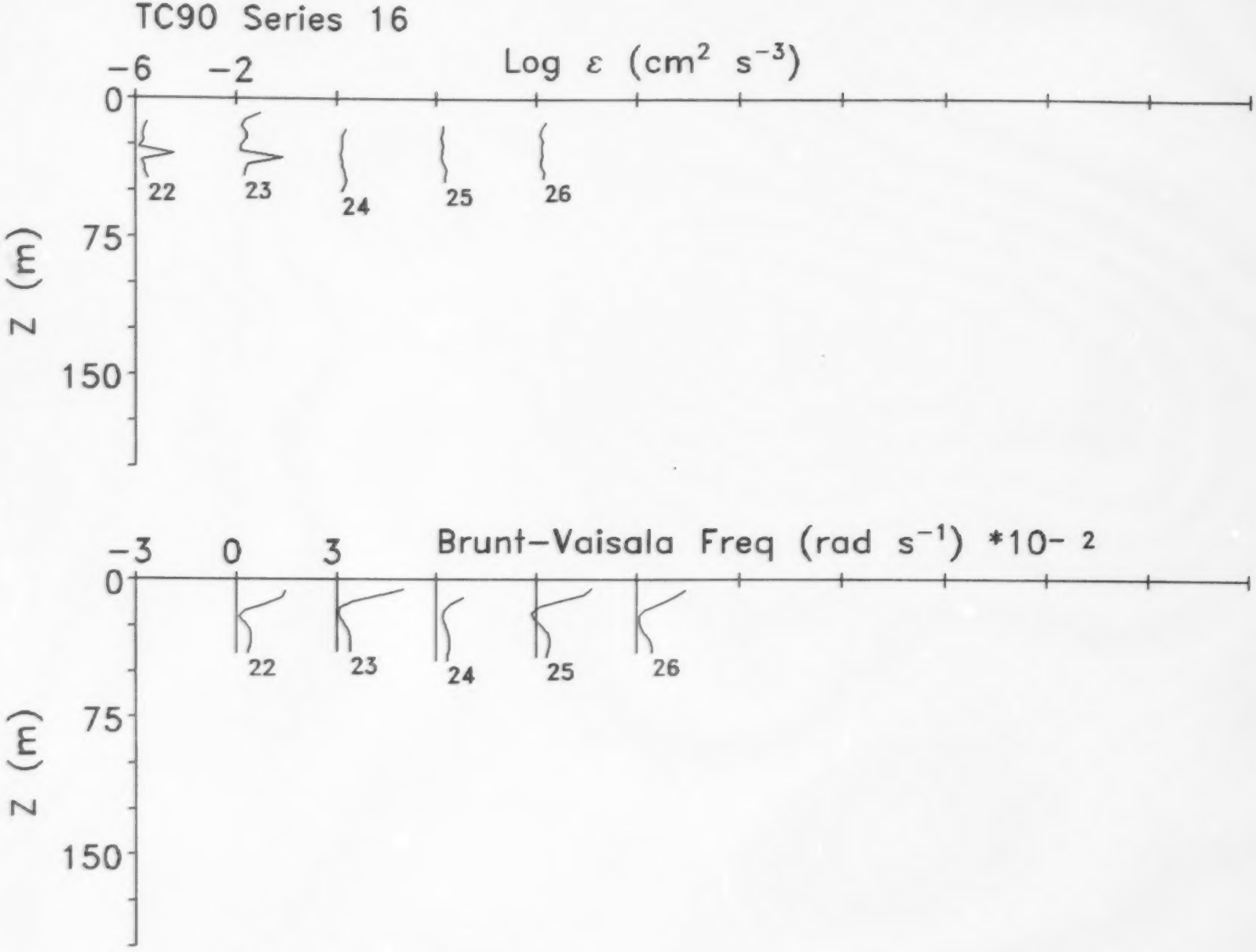

TC90 Series 16
Log ε (cm² s⁻³)
−6
−2
0
75
150
z (m)
1
2
3
4
5
6
8
9
10
11
Brunt−Vaisala Freq (rad s⁻¹) *10⁻ ²
−3
0
3
0
75
150
z (m)
1
2
3
4
5
6
8
9
10
11

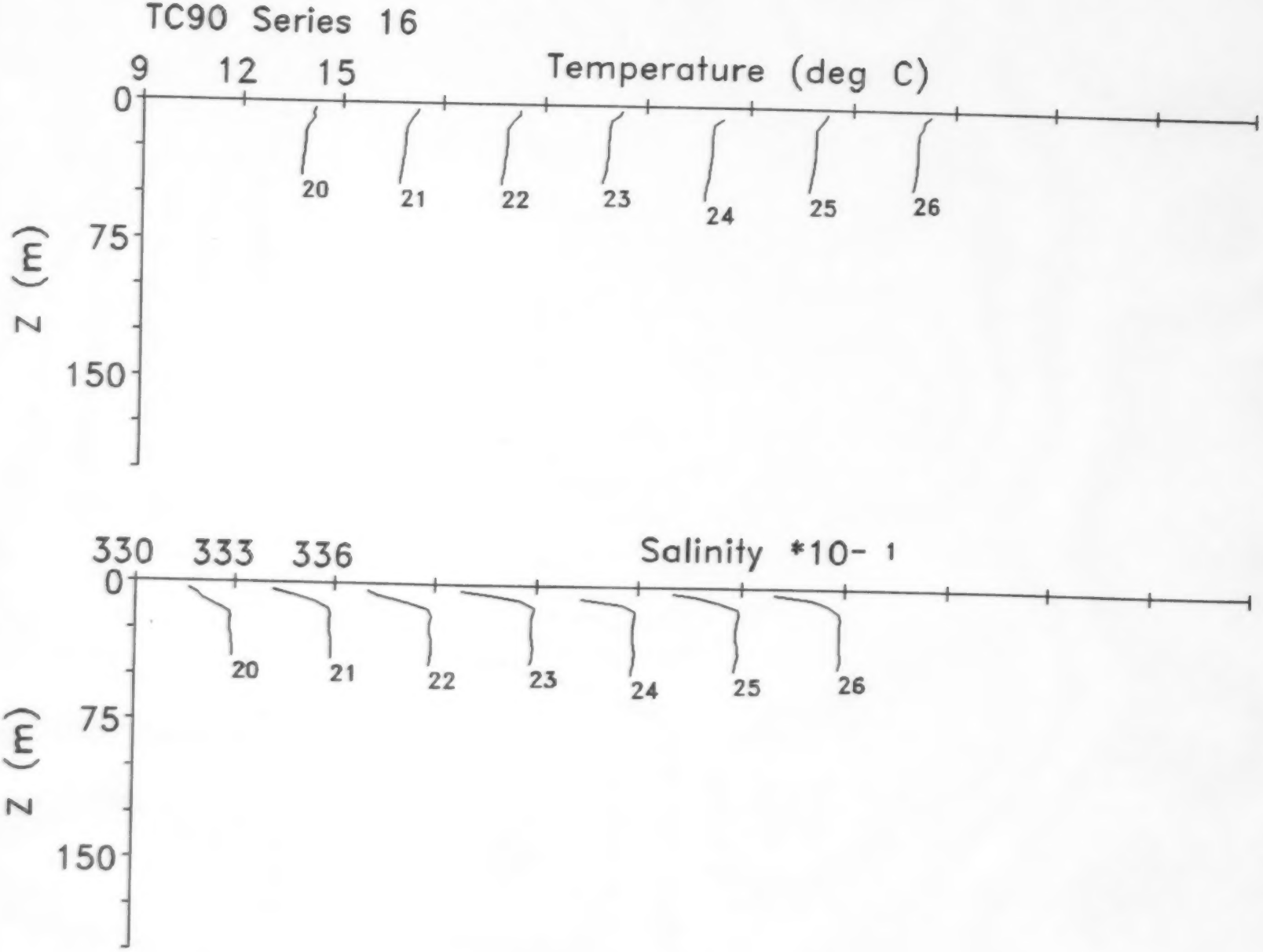

TC90 Series 16
9
12
15
Temperature (deg C)
0
75
150
Z (m)
1
2
3
4
5
6
8
9
10
330
333
336
Salinity *10- 1
0
75
150
Z (m)
1
2
3
4
5
6
8
9
10


TC90 Series 16
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
12
13
14
15
16
17
18
19
20
21
Brunt−Vaisala Freq (rad s⁻¹) *10− 2
−3
0
3
0
75
150
Z (m)
12
13
14
15
16
17
18
19
20
21


TC90 Series 16
9
12
15
Temperature (deg C)
0
75
150
Z (m)
11
12
13
14
15
16
17
18
19


330
333
336
Salinity *10- 1
0
75
150
Z (m)
11
12
13
14
15
16
17
18
19


TC90 Series 16
Log ε (cm² s⁻³)
−6
−2
0
75
150
Z (m)
22
23
24
25
26
Brunt−Vaisala Freq (rad s⁻¹) *10⁻²
−3
0
3
0
75
150
Z (m)
22
23
24
25
26


TC90 Series 16
9
12
15
Temperature (deg C)
0
75
150
Z (m)
20
21
22
23
24
25
26
330
333
336
Salinity *10- 1
0
75
150
Z (m)
20
21
22
23
24
25
26